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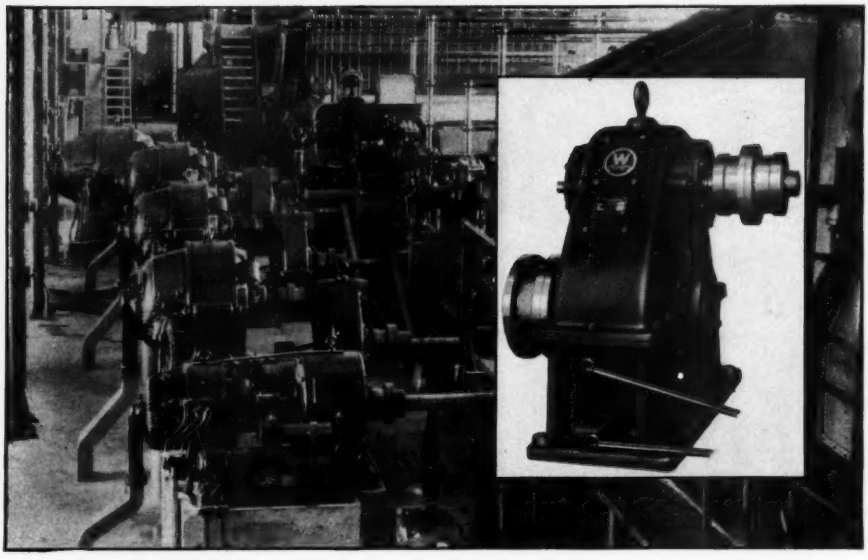

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Editorial Offices: 19 West 44th Street, New York

VOLUME XVI NUMBER ONE

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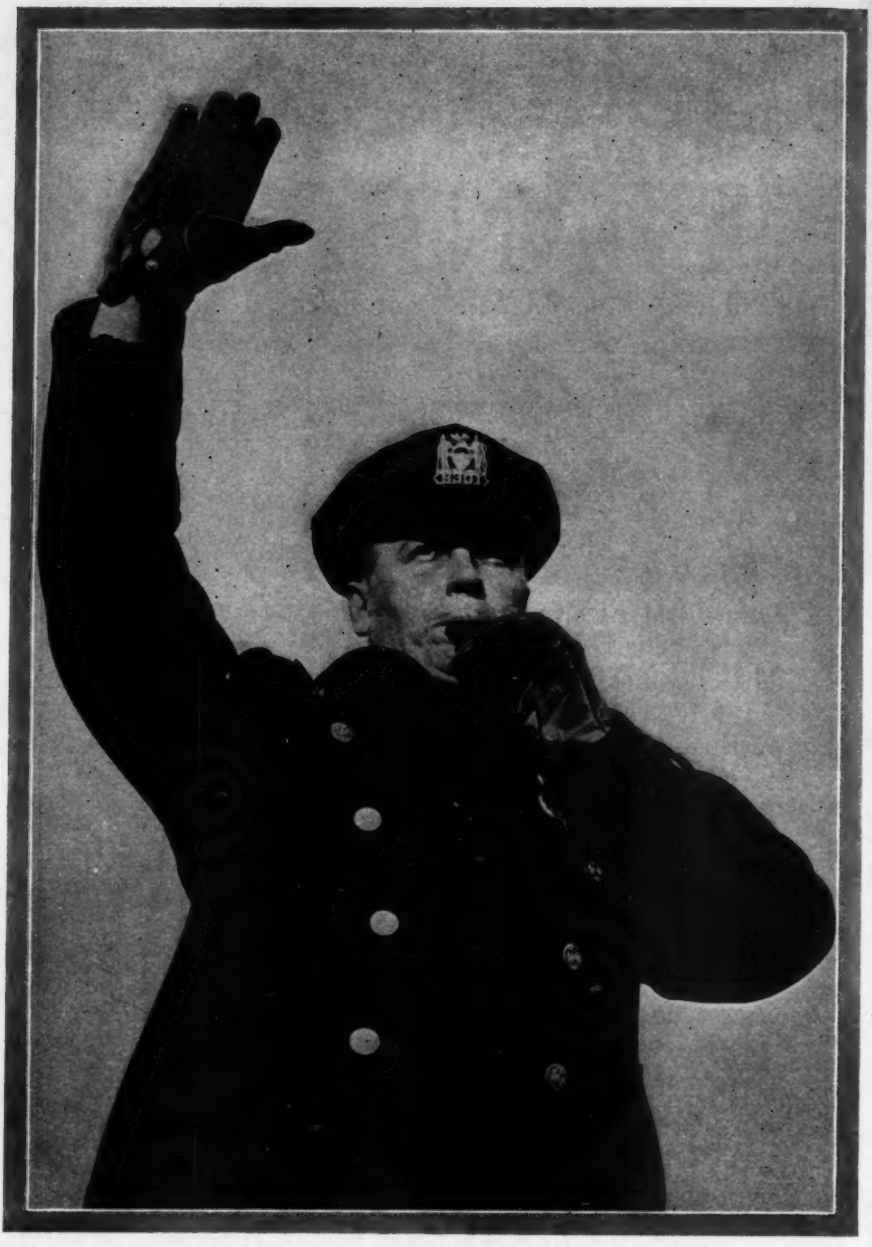

Stop! Look! Listen!

ARE YOU LIVING UP TO YOUR NEW YEAR'S RESOLUTIONS?

Better Crops with PLANT FOOD

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VOL. XVI NEW YORK, JANUARY, 1931 No. 1

Jeff Looks into the New Year

Faith, Hope, and ?

By Jeff McDermid

AMERICAN resolutions for 1931 have been published by the House of Hoover, and Congress has been asked to sell the volume to a clamoring clientele. The presidential plot for a return to red hot Americanism and omnipotent optimism gives me a key to try the locked door of the New Year.

Let me try Faith to wash down our slightly burned toast for 1931. No other short word fits the advent of another round of debts and delights quite so potently. Not claiming more than my fair share of Faith, I desire that all should have an abundance of it. It is to be had almost for nothing, and this is said to be the zero hour. We, who are going over the top, salute you!

When we wind our watches at night; when we draw a blue print; when we plant a seed—thereupon we unconsciously subscribe to Paul's definition of Faith. That reformed racketeer of Tarsus, in the light of his sublime awakening, evolved the thought that Faith is "the substance of things hoped for and the evidence of things not seen."

So it goes with our calm confidence

in the life of tomorrow; in our visioned barns and temples; our embryo wheat and pumpkins. It is only when we stop to ask ourselves what Faith and Immortality are that we become fuddled and fussed for an answer. Hence I propose to make some proletariat translations.

HOW easy it is for us to confuse Faith and Hope, and thereby include Charity and her "attic angels" sitting on the old "community chest." I desire to stop for awhile with Faith, best of the three Christian graces. Staunch Missus Faith is like an old aunty of mine who never gave us kids any gingerbread until we had earned it. Faith has a two-fisted, upstanding spirit, a daring-do, self-reliant, clean-cut tone to her—with none of the humble-pie, boot-licking, scrap-taking attributes. Faith is like going out, rough and ready, for a round or two of stump pulling in the tap-root, hard-pan slashings, where it takes a dozen army mules, a stiff vocabulary, and a keg of tri-nitrotoluoll to do a good job before breakfast.

Faith is what my neighbor, the sporting archer, displayed going after a prong-horn buck this winter, which he shot out twenty miles from everywhere with his home-made bows and arrows. The state law said he mustn't use anything but a gun, and his friends told him he couldn't hit a deer even with a gangland gatling—but he chose Faith for his partner, and vanquished his venison.

I dare say we all like the other two girls, Hope and Charity, but in the dance of life most of us prefer to pick them for the shuffle in the order named by the apostles of old—Faith in her kitchen apron, Hope in her Sunday clothes, and Charity with her nurse's uniform.

As Paul says, Faith is the substance of Hope. I think he meant that the former is confidence and conviction, while the latter is vague dreaming and listless waiting. In some things connected with Faith, there is considerable mystery as to the mainspring and source of it, especially that which pertains to the life beyond.

Avoiding all theology and metaphysics because of snares and complexity, we common folks somehow cling to rudiments of Faith which belong to our own confidence and self-respect. In this avenue there is no mystery.

Into the mundane bailiwick wherein I dwell, there came last month a father temporarily out of "gainful occupation." He gladly took a job washing storm-windows and cleaning eaves-troughs. Prior to his knock at our door he had interviewed a clubby neighbor lady, who graciously reminded him that the welfare budget at the city hall provided for such needs as his.

"Then of course," she added, "there is always the Salvation Army."

But old Missus Faith and her sister Hope stood at my frayed friend's side to nudge him in the ego. Having a well-developed ego, vitalized by years of decent wage earnings, he considered Charity a third rater and would have none of her. So the ex-mechanic became the odd-job man rather than a standee in the bread line.

IN America this winter we seem to have courted Charity and let good old dependable, homespun Faith wait awhile unwooed. Faith built our present day national assets and earned every cent we have ever secured. When Faith gave us a boost, Hope took courage and gave us a beckoning welcome. It has been that way ever since the Founders came to our country.

They had Experience and translated it into Action, with Faith as the silent partner. They had Vision furnished by Hope—after Faith opened their eyes. Not until we found some people among us who lacked Faith (for various reasons) did we require the aid

(*Turn to page 63*)

On these alfalfa plots at Whenal Farm, Greenland, N. H., the investment in potash was returned four-fold.

Long-lived Alfalfa

By Ford S. Prince

Specialist in Soils and Crops, University of New Hampshire

THE greatest need of dairymen in the Northeastern states is a cheap source of home-grown protein. It seems quite natural for them to undertake the culture of alfalfa, a long-lived, high producing hay crop, as rich in protein as many commercial dairy feeds now being sold on the open market.

The New Hampshire Experiment Station, in 1926, laid out an experiment which was designed to answer many questions already in the minds of the farmers of the state about alfalfa. Can it be grown on worn-out hay lands? What fertilizers can be used to stimulate yields of this important crop? What system of fertilizing will best contribute to the length of life of the alfalfa stand? These problems appeared to be fundamental to the spread of alfalfa growing to a point where it would on many farms, supply all of the roughage necessary to feed the dairy herds.

As there was no suitable land on the University farm for such an experiment, we were forced to carry on the work in some community where alfalfa could be successfully grown.

A field in Greenland, New Hampshire, which had been untouched by the plow for about 15 years was chosen for the test. The yield of grass on the field had fallen so low that in 1926, measured, unfertilized areas yielded less than 400 pounds of hay to the acre. The soil is an open shaly loam, underlaid by gravel, one which is not retentive of either plant food or moisture.

On such a field we decided to try

alfalfa. Predictions and prophecies were much against the success of the venture. Most farmers thought the land should be cropped to corn or other cultivated crop for two or three years before seeding with alfalfa. But as this point was one upon which an answer was desired, it was decided to plow and seed to alfalfa immediately.

Lime we knew would be necessary, and so after plowing in the fall of 1925, we began in the spring of 1926 to get ready by liming the entire area at the rate of two tons per acre. Certain plots received four tons. As the fertility of the piece was at a low ebb, a uniform application of 20 tons of manure was applied per acre. Certain plots had an additional application of 20 tons. Fertilizers were applied before seeding upon those plots which were to receive them. No fertilizer was applied in 1927, but the plots receiving fertilizer have been top-dressed annually since 1927.

The field was seeded in June, 1926, but no harvest was made that year. Two cuttings have been made annually since 1926 so that we now have four years' yield records on the field, eight cuttings in all. A total of 12.7 tons of alfalfa hay per acre have been harvested during the four seasons. This is the average yield of all the treatments.

Potash Gives Greatest Returns

On all but the heavily fertilized plots the yield of hay is on the decline. The check plots which averaged to yield over three tons per acre in 1927, gave us but 1½ tons in 1930, while on the most heavily fertilized plots, those which had extra manure and lime plus a complete fertilizer, the yield of hay was slightly greater in 1930 than it had been in 1927, being over 3½ tons per acre in both cases.

Of the elements used in fertilizing the alfalfa in this experiment, potash has given the greatest increase and the best financial returns.

As I stated before, the plots were fertilized before seeding and have been top-dressed annually since then except in 1927, so that the plots receiving potash have had a total of 600 pounds of muriate of potash per acre.

The plots which have had potash alone as compared with the check plots have averaged 1,267 pounds more hay per acre annually than the checks. Stating it in another way, one ton of muriate of potash has increased the yield of hay at the rate of 8.5 tons in this experiment. The hay from this test has been sold on the ground in the field at an average of $22 per ton. Our investment in potash has been returned to us about four-fold, which even in times of prosperity is a good rate of interest.

Potash Maintains Yields

The gains recorded for these potash plots are on the increase, varying from about 700 pounds per acre the first year to 1,700 pounds in 1930. Perhaps it would be truer to say that the yields from the check plots are falling off more rapidly than are the yields from the plots receiving potash.

The increases recorded from the treatment of potash alone are just as high as from the application of 20 extra loads of manure per acre, applied in the beginning of the experiment. It would seem, that on this soil, at least, potash is quite deficient for maximum yields of alfalfa, and that the response secured from manure is probably due to the potash therein more than to any other factor.

Where more manure was used, adding potash as a top-dressing has so far not stimulated the yield quite as much as with the lower manure application, although the increases have been bountiful and significant even on the heavily manured plots.

Neither phosphorus nor nitrogen has given such a good account of themselves as has potash, although both have increased the yield. Comparing the plots which have had superphos-

phate alone with the check plots, there is an increase of about 1,600 pounds of hay for a ton of superphosphate. Phosphorus appears to be more effective in those cases where other materials were added, returning about 1.5 tons of hay per ton of superphosphate where it was used with the high lime application over high lime alone, giving an equally good response where manure was added to the high lime treatment.

Nitrate of soda has been used in certain treatments. The increase from this material where used alone, over the check plots, has been at the rate of 7,500 pounds of hay for one ton of nitrate of soda. Nitrogen appears to be slightly less effective where it is used on high manure plots, although it is quite likely that this statement would have to be reversed should the experiment be carried on for several years without plowing or adding more manure. Increased yields from nitrogen appear to be about the same year after year, while gains from phosphorus and potash are on the increase.

Top-dress with Potash

From the standpoint of economy, neither nitrogen nor phosphorus has paid as good returns as potash in this experiment, although the yields are all in the right direction. There appears, from this test, no reason why a farmer should not top-dress with potash. Just how much nitrogen and phosphorus he can afford to buy seems to hinge upon two factors, how badly he needs the hay, and whether he wants to hold his stand for a considerable period.

Since the yields on the complete fertilizer plots which have been heavily manured are the only ones in this experiment which are being maintained, it naturally follows that if a farmer wants to hold his field in alfalfa, cutting profitable crops the while, it would be good business to use fertilizer carrying all three elements. Whether he needs the hay and what it is worth to him after he gets it certainly have their bearing on the matter. The appearance of grass in the stand should also be taken into consideration with application of nitrogen.

The amounts of fertilizer we are using, as well as the carriers themselves, have not varied in this test. It is quite possible that larger quantities, particularly of potash, might be used to advantage. It may be that different carriers of phosphorus and even of nitrogen might be more effec-

(*Turn to page* 55)

A general view of the alfalfa plots at Wheaal Farm, Greenland, N. H.

The Suwanee River Country

By J. Francis Cooper

Editor, Florida Agricultural College

Way down upon the S'wanee River, far, far away,
Dere's wha my heart am turning ever, dere's wha de old folks stay.

All up and down the whole creation, sadly I roam,
Still longing for de old plantation, and for de old folks at home.

THOSE words, the opening stanza of Stephen Collins Foster's immortal Southern folk-song, "Old Folks at Home," have caused the placid little Suwanee River to be known and sung around the world. This sluggish, meandering stream, whose banks are lined with moss-draped trees, rises in the Okefenokee swamp in southern Georgia and wends its way through Florida to the Gulf of Mexico. Its sole claim to undying fame rests in the fact that Foster included its name in his folk-song. It has no commerce, is not bordered with thriving cities, and is surpassed in both length and breadth by many other rivers throughout the world. Curiously enough, if fairly credible legend is to be trusted, Stephen C. Foster never saw the stream which he immortalized.

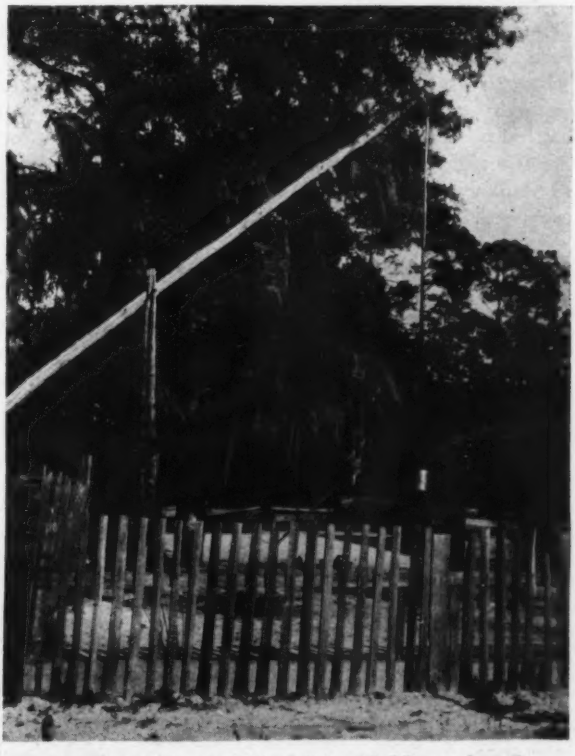
Although the name of the river is known far and wide, very few people outside of Florida and Georgia know anything about the agriculture of the country surrounding this stream. And at the beginning, it must be stated that the Suwanee is not bordered with fertile valleys, as are the Mississippi, the Nile, and other well-known rivers. Yet, the country near, if not immediately adjacent to, the Suwanee has made contributions of no little importance to the agriculture of the United States.

Fortunately for Foster, whose songs were written before the Civil War, there were colonial farms and mansions in the Suwanee country, some of them, whose remnants are yet standing, on the very banks of the river. However, these bat-infested, old mansions are but reminiscences of a former glory, when "the old folks at home" were surrounded with slaves and the forests not far distant were roamed by Indians. Much of the Suwanee country is yet forested, and abounds in game, while the stream is still a fisherman's paradise. But it is the paleface conqueror and not the dusky Seminole redskin, long ago driven to the vastness of the Florida Everglades, who stalks his prey there now.

Although the Suwanee flows across the State of Florida, noted for its citrus fruits and winter truck crops, the farming carried on in the immediate Suwanee country is of a general nature, such as is found in any Southern state. Some counties in the area advertise themselves as "hog and hominy" counties. Cotton, corn, tobacco, peanuts, hogs, dairy and beef cattle, and poultry are among the principal commercial crops. Just a few miles to the south begins the citrus and trucking area.

Recent years have seen a noteworthy improvement in the cattle of the Suwanee country. With the eradication of the cattle tick from one of its last strongholds, improved dairy and beef animals have been brought to the farms of counties bordering the Suwanee and their farmers have enjoyed a fuller measure of prosperity as a result.

The land "boom" experienced by Florida in the past decade is not the first one occurring in the state by any means. Part of the Suwanee county, around Gainesville, was the center of such a boom about 1885, 35 years preceding the most recent Florida boom. Five or six years after the transfer of Florida to the United



An old well in the land of "the old folks at home."

This granite monument to the memory of Stephen Collins Foster stands on the banks of the river at Fargo, Ga. It was unveiled by the people of South Georgia on October 27, 1928. Scene shows it just after the unveiling ceremony.

States, in 1819, pioneers began to come into the Gainesville area from adjoining states. Indian wars broke out in great violence in 1835 and white settlers were temporarily forced back. At the close of the Indian wars, rapid agricultural development of the area occurred.

Long staple sea island cotton was a profitable industry of the area in its early development, although sugarcane, tobacco, rice, corn, and sweet potaoes were grown. Citrus growing, also, was started in the area in 1859.

After the Civil War, many of the soldiers, pleased by the climate or attracted by the resources of the region, returned to make it their home. Sea island cotton continued to be the principal industry until a caterpillar, perhaps the fall army worm, became destructive, and some localities abandoned the culture of this crop. Attention then was turned to citrus growing. The orange groves were productive and profitable. About 1880 truck growing also was assuming importance.

That both citrus and truck were proving profitable resulted in the "boom" of this area, in which the wildest speculation in Florida lands ensued.

However, the "big freeze" of February, 1895, killed many of the orange trees. Another freeze exactly four years later still further cramped the citrus industry, which was moved to more southern parts of the state. Attention was again turned to sea island cotton, which was produced in abundance until the advent of the boll-weevil. Since sea island is a late maturing cotton, the boll-weevil again put this industry out of business.

Although the farming of the Suwanee country is general in nature, this area has been instrumental in the introduction of new crops into the South which are now enjoying widespread distribution and which are adding thousands of dollars to the income of Southern farmers every year. The Florida Experiment Station at Gainesville is only 35 miles from the Suwanee River, and has served as the focal point for these plant introductions, which have been made by the United States Department of Agriculture and the Florida Station.

The early farmers in the Suwanee country, as did those throughout a large part of the humid South, cleared some "new ground" every year, farmed it for a few years until its fertility was depleted, and then abandoned it. With forest lands plentiful, loamy, fertile "new grounds" were obtainable for the clearing. When timber lands became scarce and valuable, naturally one of the first things which should engage the attention of

farmers and those interested in farming, was the finding of methods for rejuvenating worn soils and keeping others from becoming depleted. Leguminous crops, which produce such abundant growth on poor soils, offered a promising possibility.

In the South, which has a warm, humid climate, bacterial action, tearing down the organic matter in the soil, takes place over a large part of the year, and the rains tend to leach out of the soil the plant foods thus made available. Leaf mold, animal manures, and other forms of organic material can be used to replace the depleted organic matter. However, the legumes have brought about the practice of "green manuring"—a leguminous plant is grown and turned under green. If part of the plant is harvested for forage, still the stubble and many leaves remain to be turned under for the benefit of the soil.

Turn to New Crops

Cowpeas were early accepted as one of the desirable legumes for the South. However, other legumes making more rank growth and suitable for use as both forage crops and soil improvers have come into general use throughout the South. Among these are soybeans and velvet beans.

The velvet bean has been introduced to the South by the Florida Experiment Station, and is one of the most notable contributions of the Suwanee country to Southern agriculture. The first planting of the velvet bean at the Florida Station was made in 1895. The seeds were sent to Director Oscar Clute by a resident of central Florida, who called the plant a "pea." No information could be given as to the origin of this plant, but it was stated that it had been used in that section for 20 years as a covering for trellises and unsightly places. The name "velvet bean" seems to have been used first in Bulletin 35 of the Florida Experiment Station, published in 1896. As with many other crops now largely used, it was considered poisonous to stock.

Shortly after the Experiment Station began work with it, the velvet bean came into extensive use in Florida. The long growing season necessary for the production of seed, however, restricted its use to that state at first. The original variety, now known as the Florida Speckled, requires from 175 to 190 days to mature seed. In 1907 seed of an earlier maturing variety, the Lyon, were introduced from the Philippine Islands by the United States Department of Agriculture. The first introductions, unsuccessful, were followed by others which gave better results. Early maturing varieties arose spontaneously, and hybrids were developed, and for the last 15 to 20 years the velvet bean has been grown extensively in the South.

The velvet bean is a rank-growing leguminous plant, producing heavy yields. It can be mowed for hay, although its viney nature makes it difficult to handle. Bunch velvet beans

Velvet beans, showing vining habit of growth and tremendous production.

have been developed, which are not so troublesome from this standpoint. Most of the varieties have tough pods which do not split open even when left in the fields until late winter. This quality makes the velvet bean an excellent plant for winter grazing, and it is often planted in corn fields, the corn is harvested, and then cattle are turned into the fields to graze the beans and corn husks through the winter. The velvet bean, high in protein content, makes an excellent balance for the carbohydrate feeds.

After the velvet bean came Crotalaria, another leguminous plant which makes a tremendous growth on poor soils, but which, unlike the velvet bean, is not a good forage crop, that is, the species of Crotalaria now grown are not relished by animals. Species with finer stems and sweet to the taste, like alfalfa, which will be relished by cattle, may be a development of the very near future. If they come, they will provide the sandy lands with a forage crop similar to the one now flourishing in the richer, limestone clay soils.

The first plantings of Crotalaria were made at the Florida Experiment Station in 1909. For years very little was done with it, but since 1920 it has come into widespread use in Florida and the Southeast as a soil improving crop which grows well on poor, sandy lands. It is another notable contribution which the Suwanee country has given to Southern agriculture.

(A full discussion of Crotalaria is contained in the May, 1930, issue of BETTER CROPS.)

Turning aside from the legumes, the Suwanee country is now making another noteworthy contribution to the agriculture of the Southeast. The new crop, tung oil, is enjoying widespread interest and popularity, indicating that it will soon take its place as a cash crop in the southern part of the Gulf Coast states. It is estimated that approximately 15,000 acres will have been set to tung oil by the first of March, 1931, and no doubt thousands of acres will go in each winter for some time.

Tung oil is produced from the seeds of the tung-oil tree, a native of the interior of China, which was first introduced into the United States in 1905 and has since been tried at various places throughout the southern half of the United States, from California to Florida. However, it has found its best adaptation in the Gulf Coast region.

First plantings were made on the grounds of the Florida Experiment Station in 1912. Those trees are still flourishing, and have been the nucleus around which has developed the American industry. The first acreage of any consequence was in Alachua coun-

(*Turn to p. 59*)

Club boys in the Suwanee River Country are now raising fine dairy cows.

Fertilizer Facts for Sandy Soil Farmers

By G. E. Langdon

Wisconsin College of Agriculture

SUPPLYING sandy soils with a well-balanced diet of plant food calls for judgment on the part of the farmer as well as a knowledge of what such soils need.

After 10 years of experimental work with sandy soils, Mr. A. R. Albert, who directs the Hancock-Coddington Branch Experiment Station of the Wisconsin College of Agriculture, has a number of practical suggestions to offer on the subject of fertilizing light soils.

In the suggestions which follow, Mr. Albert has assumed that livestock farming is carried on and that sands and sandy loams are being used:

"Use higher nitrogen and higher potash mixtures when manure has not been used, and when no legumes have been grown, or when the soil is very light.

"Select lower nitrogen formulas, but keep the potash high on the dark to black colored sands.

"Use lower nitrogen formulas following legume green manuring and higher when rye is used.

"Use the higher phosphoric acid formulas on grain crops and other crops whose maturity need to be hastened or fruiting encouraged (such as cucumbers).

"Buy higher phosphorus and lower nitrogen and potash mixtures as more manure is being produced.

"Use less potash on the sandy loams than on the sand."

For "complete balanced fertilizers" such as 5-8-7, 4-8-6, 6-12-9, 4-8-8, and 15-32-15, Mr. Albert suggests the following uses:

"For potatoes in rows at 300 pounds to 500 pounds on any sandy soils with manure or clover sod or both and where previous good management suggests a good supply of organic matter.

"For potatoes on sandy soil without clover sod or without manure but well supplied with humus, at 750 to 1,000 pounds an acre, one-third in rows and the balance broadcast or as side-dressings at cultivation.

"For corn on impoverished soil without manure or clover sod turned under at 400 to 500 pounds an acre,

FOUR FERTILIZER FACTS

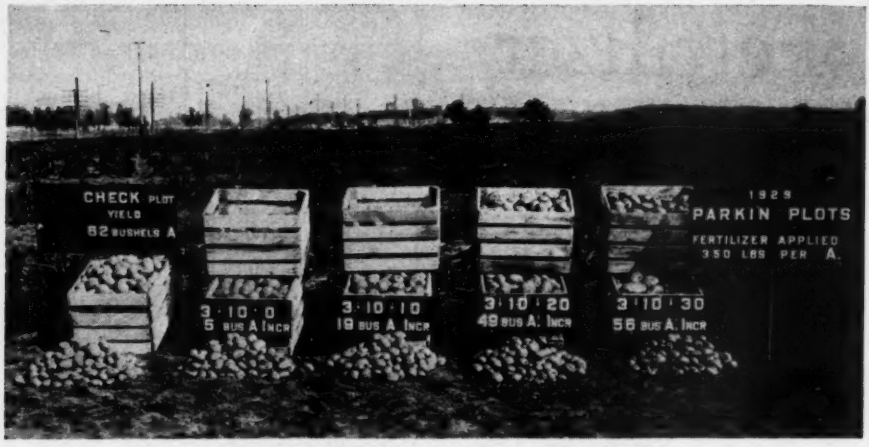
"The fertilizer must be in the root zone of the plant and in moist soil to be most effective.

"Fertilizers should never be plowed under except when they must be applied with manure, and when broadcast on meadows several weeks before plowing.

"Fertilizers should be applied as near to the time of use by the crop as practicable, and ought never be exposed to the danger of blowing or washing off.

"The concentration of the fertilizer near seeds and young plants must not be very high or germination and growth may be retarded or prevented."

—A. R. ALBERT.



EFFECT OF FERTILIZERS ON RURAL NEW YORKERS

These were grown in check rows in 1929 on unmanured alfalfa sod. Fertilizers were side-dressed and applied at the rate of 350 pounds per acre. This 1929 experiment showed bushel increases per acre of the following amounts: Check, 62 bushels—3-10-0 fertilizer, 5 bushels an acre increase; 3-10-10 fertilizer showed increase of 19 bushels an acre; 3-10-20, an increase of 49 bushels an acre; while 3-10-30 showed an increase of 56 bushels an acre.

either all broadcast after plowing or one-fourth to one-fifth in hills and the balance broadcast just before or after planting or side-dressed.

"For rye on light sands, when not in rotation, at 250 to 300 pounds an acre broadcast in the spring and worked in.

"For cucumbers at 500 to 1,000 pounds an acre with a moderate application below or around the hills at planting and the balance broadcast around the hills or applied before planting.

"For truck and small fruits on sandy soils at 1,000 to 1,500 pounds an acre applied as best suits the nature of the crop and as often as needed."

For the fertilizers which are low in phosphate and high in potash such as 0-8-32, 0-9-27, 0-7-30 and 0-15-30, Mr. Albert has found that certain uses are most desirable. For instance:

Use such mixtures on light sands for grain which is to be seeded to legumes when the land was manured or had clover sod turned under, or both, for corn or potatoes. Apply 300 to 500 pounds an acre in the spring to grain, but vary the amount somewhat according to the amount of manure applied and the length of rotation.

Use for all legume seedings without nurse crops, legume crops, or legume green manures on light sands at 200 to 400 pounds an acre.

Use for potatoes on light sandy soils where plenty of nitrogen has been supplied both by green manuring and the use of manure. Use at 300 to 500 pounds in rows.

Use for top-dressing alfalfa two or three years' old on sandy fields, or farms which are managed as livestock farms, at 400-500 pounds.

In using fertilizers having about equal amounts of phosphate and potash (such as 0-12-12, 0-14-14 and 0-20-20), Mr. Albert advises that on the whole these may be applied in nearly the same manner as the low phosphate and high potash fertilizers on sandy loam soil, or on well-managed dairy farm light sandy soils, with but two exceptions. The first is that on light sandy soils, alfalfa top-dressings should be a high potash mixture when manure is not used, and second that these mixtures are not so suitable for row applica-

(*Turn to page 59*)

TEXAS

Agricultural Experiment Station

By A. D. Jackson

Editor of Texas Station Publications

THE Texas Agricultural Station, through 53 years of activity, has consistently shaped its endeavors to serve in the development and in the better utilization of the vast domain of Texas embracing approximately 168,000,000 acres of land. The organization of an Agricultural Experiment Station to serve an extensive area of such diverse conditions has resulted in the establishment of 19 divisions of effort at the Main Station, supplemented by a system of regional stations or substations, 20 in number, to provide for the study of regional problems.

It is the well-defined policy of the Texas Station to conduct experiments of statewide application at the Main Station, and to use the regional stations or substations for the conduct of experiments pertaining to the particular agricultural region and allied areas. Thus the problem of the storage quality of eggs as influenced by feeds, or the problem of contagious abortion, and similar problems of statewide application can be carried out at the Main Station; whereas problems of a regional nature, such as water and soil conservation in a well-defined agricultural region embracing certain soil and climatic conditions, must be studied at a regional substation. Likewise, the projects concerned with citrus production or rice production must necessarily be studied at regional stations where these crops are adapted.

A. B. CONNER

Director since 1926, has been on the station staff since 1904, has had a leading part in the selection and development of crops and livestock best suited to the various regions of the state, and has instituted a vigorous program of research and a station organization that is serving every phase of agriculture in the state.

Such regional studies at substations, nevertheless, have their definite alignment and placement with the particular division of the Main Station concerned with the particular regional problem. In this way research with the laboratory and field experiments is so placed that the experiments can be most advantageously correlated and conducted and made to yield the most trustworthy results.

The diversity

of soil and climatic conditions in Texas exists through a series of geological formations, ranging from some of the newest to some of the oldest soils. Moreover, these soil belts are further affected by variations in altitude ranging from the near sea level in the southeastern part of the state to an altitude of approximately a mile in the northwestern portion; and with the rainfall ranging from 65 inches in the southeastern portion of the state to 10 inches in the extreme west; from a sub-tropical temperature in the extreme southern portion of the state to Central Great Plains conditions in the northern part. These conditions greatly complicate and multiply the numerous agricultural problems that confront the farmer, and it is believed that the present system of stations provides an effective and systematic means of studying these multiple and complex problems.

The several divisions of the Texas Station have under investigation 165 specific projects, embracing work at the Main Station and at substations. As a result of previous work, some outstanding and valuable information has been secured and published, and is now being used by farmers and ranchmen through the assistance of county agents and other disseminating agencies. A few examples will suffice to illustrate the nature of these accomplishments:

Studies were begun in 1923 to determine the cause of loin disease in cattle, a disease of serious nature resulting in considerable losses to stockmen in the Gulf Coastal Plains region. In the course of six years it was determined that this disease is caused by a toxic substance produced in fresh bones and carcass material, which, when consumed by animals in sufficient quantities, brings the animal down and results in death unless extraordinary attention and care are given. The removal of such bones and carcass material from the range has resulted in the elimination of the disease; and, in the course of the experiment, it was found that the feeding of sterilized bone meal would supply the animals on the range with the lime and phosphate which they could get otherwise under range conditions only by chewing the bones; also that the feeding of bone meal not only prevents the animals from picking up the bones, but as well brings about a marked increase in the growth and weight of the animals. By a systematic removal of fresh bones and carcass material from the range and the use of bone meal to supply needed elements, the disease was not only brought under control, but better developed animals have been secured. Although the isolation of the organism has not yet been effected, a means of control has been determined

A flock of Angora Kids. Texas has 83 per cent of the Angora goats and produces 86 per cent of the mohair of the nation and, of course, leads in the production of chevon. The kid boxes in rear are about 12" x 12" x 12". Until a kid is several days old, the mother is not always able to select her own from a random group. The kid accordingly is staked near one of these boxes which furnishes a retreat from the scorching sunshine or biting winds, and when the doe returns from grazing, she can readily select her own kid. The kids in the picture are able to take care of themselves and find their mothers.

The admin'stration building of the Texas Agricultural Experiment Station and other suitable buildings house the indoor laboratories and the offices of the station staff.

and the ill effects of the disease are being eliminated.

Another contribution of the Texas Agricultural Experiment Station to the development of the resources of Texas has been in connection with the testing out of a large number and variety of cottons at the regional stations in what is now the northwestern cotton region. It has been determined that the cotton plant is inherently a drought-resisting plant, and, in the main, fully as reliable a crop under dry-land conditions as are the grain sorghums, notable for their production under these conditions. Accordingly, there has followed a development of a new cotton region, much of which is beyond the limits of infestation by the cotton boll-weevil and by cotton root-rot disease. This new region embraces from 12,000,000 to 15,000,000 acres of land suited to cotton, and is now the second largest cotton producing region in the state.

The grain sorghums, of which Texas produces approximately one-half of the nation's crop, have been found to be as reliable as a grain crop throughout the western part of Texas as is corn in the eastern half of the state. These findings have been very largely the result of research work,

More than 40 per cent of the grapefruit plantings of continental United States are in Texas where this popular citrus fruit attains an excellence of flavor and quality not found elsewhere.

and the development of strains particularly suited to the region has progressed to the extent that practically every variety of grain sorghum grown in Texas today has been introduced or developed by the Texas Station and the United States Department of Agriculture in cooperation. Moreover, the result of feeding work by this and other stations has established the fact that grain sorghums have nearly the same feeding value as corn, pound for pound, whereas 25 years ago this grain was considered to be worth only about 80 per cent as much as corn for fattening and finishing livestock. The significance of this finding is obvious when it is realized that Texas sends to other states annually 1,000,000 head of feeder cattle for fattening and finishing which might, in a large measure, be finished on Texas feeds.

The finding of a suitable and dependable grain crop and the determination of the fact that the region has unusual opportunities in the economic production of cotton, supplementing the utilization of the land for growing wheat and for grazing purposes, has been followed by revolutionary changes which have resulted in greatly increasing the efficiency of production. Among these improvements have been the use of improved farm machinery, such as tractors, power cultivators, combines for the harvesting of wheat and grain sorghums, and progress in the development of cotton harvesting machinery; and in these fields the Station has contributed much in the way of the development of information through projects relating to these different phases of economic production.

Leads in Wool Production

Texas has 83 per cent of all the Angora goats in the nation and produces 86 per cent of the nation's mohair crop, according to the bulletin of the National Association of Wool Manufacturers' Annual Wool Review for 1929. It is also the leading state in wool production. These industries are confined very largely to a region of approximately 20,000,000 acres known as the Edwards Plateau region. In this section, through the Ranch Experiment Station located in the region, the Station has rendered a valuable service to the sheep, goat, and cattle industry through its work in diversified grazing and the proper balancing of the different classes of livestock in the better utilization of range land and range vegetation. The work has progressed to an extent that throughout the Edwards Plateau region the practices followed represent a high degree of efficiency in the utilization of range land.

Other Industries Growing

Texas is a factor in the production of citrus fruit, having at this time 40 per cent of the total plantings to grapefruit in the continental United States. The Texas Station has contributed to the development of this industry and to the vegetable industry through its station located in the lower Rio Grande Valley, particularly in matters relating to information and practices that aid in the efficiency of production and the quality of products. The Station has determined that the Lower Rio Grande Valley grapefruit is of especially high quality, therefore acceptable to a wide range of markets.

Texas is rapidly developing a fig industry in the eastern part of the Gulf Coastal Plains region, and, through the Station located in that region, has developed and is developing useful information in connection with the production and value of this crop. It has been determined that the fig can be picked when it is fully matured and before it is ripe without losing any of the food value, a matter of importance both to the growers and to the consumers of the product.

The Texas Station has developed much valuable information in connection with the conservation of rain-

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Weeds Can Be Killed *with* KAINIT

By George R. Cobb

Salisbury, Maryland

ALTHOUGH the encyclopedia tells us that Noah Webster was a lawyer, it is evident that he either farmed or at least had a home garden, for he defines a weed as a "useless and positively troublesome" plant.

The strawberry growers on the Del-MarVa Peninsula—several thousand of them—are firmly convinced that sheep sorrel (Rumex acetosella) is the plant that Webster had in mind when he so aptly defined a weed.

Professor H. C. Rather of the Michigan State College, in a recent issue of the *Journal of the American Society of Agronomy,* discusses the weed problem and states that it is attracting new and rather wide attention on the part of several interests. Other authorities, in the same issue of this publication, cite cases where sodium chlorate has been used, more or less successfully, in eradicating weeds such as quack grass, bindweed, and Canada thistles.

In the olden days farmers were told that sheep sorrel was an acid-loving plant and would not thrive in a sweet or neutral soil. The remedy, therefore, was very simple, just apply lime. That this advice was incorrect has been proven time and time again as farmers have applied lime very consistently, yet the sorrel still persists.

The use of kainit to eradicate charlock (Raphanus raphanistrum) has proved satisfactory in Germany, Great Britain, and Nova Scotia. Tests with kainit on other weeds have been more or less successful.

Realizing that kainit contains a valuable plant food, potash, and that it had given good results as a weed eradicator, arrangements were made with J. Frank Parker and Reuben Esham, extensive strawberry growers, residing near Pittsville, Maryland, to cooperate in tests with kainit as applied for the eradication of sheep sorrel.

The rows on the right were treated with kainit, 400 pounds per acre, before the strawberry plants were set. Note the large clumps of sorrel on the untreated plot at the left.

Before the treatment with kainit—note the dense covering of sheep sorrel. This is the same field as that pictured below.

Incidentally Pittsville, Maryland, is one of the largest strawberry shipping centers in the United States. The town of Marion, in Somerset county, Maryland, leads the country by virtue of shipping about 600 carloads of berries annually. Other very important shipping points on the DelMarVa Peninsula are Selbyville, Delaware, and Fruitland, Maryland. Therefore, with many acres of land on the Peninsula devoted to the cultivation of strawberries, weed control assumes a place of prime importance in the industry.

A popular rotation among strawberry growers brings berries after a corn crop. The constant cultivation given to the corn crop in the early season has a tendency to keep down weeds to some extent, but later on in the season cultivation ceases and weeds are in their glory. If the weeds can be killed during the corn crop season, the land will then be in much better condition to receive the strawberry crop the following spring.

Mr. Parker applied 500 pounds of kainit, per acre, on two acres in a large field, leaving the remaining acres untreated. The land was plowed and

(*Turn to page 56*)

Early in the spring, before the land was plowed for the corn planting, 500 pounds of kainit per acre were applied. Only a few small clumps of sorrel survived.

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

"IN our grasp for knowledge we have tried to substitute science entirely for sentiment forgetting that the really essential things of life cannot stand close analysis because they are held together by faith."

So spoke the late Herbert Winslow Collingwood eminent agricultural editor and author of the uplifting and inspiring Hope Farm Notes of the Rural New Yorker. He believed that while the future of our land lies in the hands of the little children who are playing on the city streets or in the open country, the success of their work will depend chiefly on the pictures which are being printed on their minds and souls. It was his idea that the future will be safer if the children are imbued with poetry and imagination, as well as the multiplication table.

These were the sentiments and wholesome philosophy of a man who, as a boy, knew real privation and had to struggle up in a stern and loveless environment. They were evolved in the inner consciousness of one who, throughout the greater part of his life of usefulness, sat in the solitude and silence of deafness, as behind a great black cloud, yet found in its darkness a silver lining out of which he shed rays of cheer, hope, and comfort on all around him.

Herbert W. Collingwood was born on a farm near Plymouth Massachusetts on April 21, 1857. His father volunteered, and was killed at Fredericksburg, in the Civil War, leaving behind him his wife and five little children, with practically no material resources.

As was the custom at that time, the boy was "lent out" to an old farmer, whose place was situated near the "neck" of Cape Cod. There the lad was brought up, on the little rocky farm. In summer he hoed among the stones and in winter pegged shoes, braided straw, made husk mats, and worked at other similar jobs. The sawing and splitting of firewood was also a winter task and a "stent" was set out for him each day.

Learned to Value Sunshine

He would not have minded the work so much had not the stingy old farmer made him do it on the cheerless, frosty, northern side of the barn, while the cow, hens, and sheep always stayed on the southern sunny side, which represented the comfortable and bright side of life. The farmer argued that if the boy worked too much on the sunny side, he would stop to look at the passers-by, feel some of the joy of living, and stop working to absorb some of it.

To Herbert, it seemed strange that the farmer failed to understand that the sunshine which made the hens lay well would also stimulate him to do better work. Thus early he learned to moralize and philosophize and he made up his mind to imbue his own life's work with sunshine. He vowed, too, that if he ever had a chance to influence or direct the lives of farmers,

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he would do his best to have them live and work on the sunny side of the barn. This wise resolve he fully carried into effect, when opportunity offered in his later life.

In winter, he went to the district school, until not quite fourteen; then he spent two terms in the high school. But his studies ceased at that stage; for he was put to work in a Boston book-store, where, happily, one of his duties was to run errands for the authors who frequented the place. Among these were Longfellow, Whittier, Emerson, and other great men, who made Boston famous in those early days.

He saw many episodes of their lives not apparent to the public, and they took an interest in the errand boy who learned from them to read worth while books. Thus he acquired the reading habit, which he came to regard as his salvation; for it caused him, as a lone boy in a big city, profitably to employ his idle hours, avoid temptations, and "walk straight." He read Shakespeare, the old British poets, Dickens, Scott, and their noted contemporaries, before he was twenty, and although he did not understand all they wrote, the perusal of their works made him a book lover.

Found Inspiration in Men

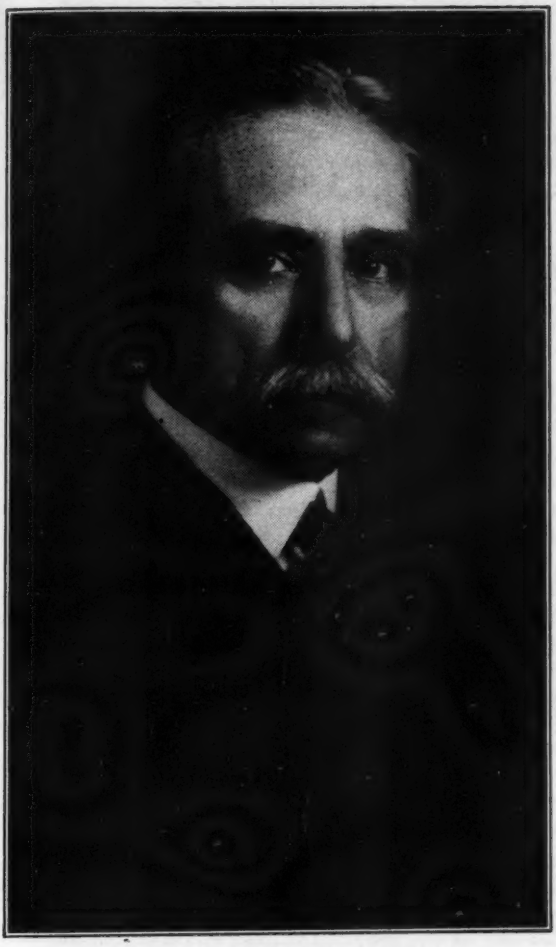
The great men with whom he was privileged to converse were also an inspiration. Always, he recognized and prized these early influences. Of that period he wrote: "I think this part of a man's biography the most important of all; for nine out of ten, the men I know were made or unmade before they were old enough to vote. By that I mean that the influences of their childhood and younger manhood, what they read and thought, and the mental pictures stirred up in them, were the things which made their lives."

The developing young man did not like city life, however, and saw no opportunity there, so he decided to "go West," and landed at Greeley, Colorado, not long after that town was organized. There, he worked as a hired hand, sheep herder, and cattle herder. He had despaired of obtaining a college education, but when a graduate of Michigan Agricultural College assured him he might work his way through that school, he "hopped a freight," and managed to enter the institution.

He confessed later that probably he did not pass the entrance examination, but believed the good old men at the head of college affairs in those days recognized his earnestness, distinguished honest desire from ignorance, and accordingly allowed him "credits." Anyhow, they let him in, and he succeeded in working his way. It was fortunate, he thought, when he was actually permitted to milk the college cows for eight cents an hour. Later, he celebrated the occasion when he "struck a Saturday job at ditching," for which he was paid the munificent sum of twelve cents an hour. Teaching district school and working in lumber camps during winter also helped pay his expenses.

The plodding student did not claim that he stood high in his classes. Indeed, he said the records probably were against him. Nor did he think the college course of those days really superior to that of a good high school today. But of priceless value to him through life was the example and inspiration he received from such great men as Dr. Abbott, Dr. Kedzie, Dr. Beal, and his other eminent teachers who, since then, have gone to their reward.

When the young graduate left college, the problem facing him was what to do with an education which had not fitted him for anything in particular. At that time there were only a dozen or two silos in Michigan, and the cream separator was practically unknown. Throughout his entire college course, the word bacteria was not used over twenty times, and no one knew how clover obtained



HERBERT WINSLOW COLLINGWOOD

its nitrogen. Not a pound of butter was made at the college during his stay there, except by the wife of the farm foreman. In despite of his "scientific training" nobody seemed to need or want young Collingwood, and so he resumed work as a farm laborer and later worked as a fruit farmer. In 1883 he was appointed editor of the Southern Live Stock Journal, and gained experience in that position until, in 1885, he became editor of the Rural New Yorker, in which situation he labored strenuously until the time of his death, at Hope Farm, Woodcliff Lake, New Jersey, on October 21, 1927.

It seems needless to tell how the deaf farm-philosopher built up the paper of which he became the main spring. It just grew and grew in the number of its readers and in influence, as a guide and inspiration for better farming, better living, better thinking and upright, honest citizenship. Collingwood never bragged about himself, for he was eminently modest. All I knew him to say about his efforts was:

"I have been working all these years as best I could with such problems as seem to be within our reach. I do not k n o w t h a t we have accomplished anything in particular. I certainly do not feel that I have personally, and all that I can lay claim to legitimately is a sort of bulldog tendency to hang onto the thing after most of my friends think there is nothing left in it. I have just taken up the thing that came to my hand, and stuck to it. There has been no great art about it, certainly no great science; nor do I feel that there have been great results. But I have lived to learn that he who goes through life searching for the results of his own labor will never find them, for should he reach any, or should he ever do anything that is worth while, they will present themselves all in good time without his hunting for them."

Yet honors came to H. W. Collingwood. In 1906 Michigan Agricultural College added the LL.D. degree to the B.S. it had conferred upon him in 1883, and the Wisconsin College of Agriculture gave him its honorary

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Green Manures *and* Vegetable Production

By J. W. White

Professor of Soil Technology, Pennsylvania State College

SUCCESSFUL vegetable production depends primarily upon the maintenance of a liberal supply of soil organic matter throughout the growing season. The excessive decay of organic matter brought about each year as the result of intensive soil cultivation, together with the nitrogen removed in crops and lost in drainage water, lead to rapid depletion of the fertility of the soil. Perhaps the most serious problem confronting the vegtable growers today, as far as economic production is concerned, is that of replenishing the organic matter and nitrogen lost from the soil and finding means of conserving that left at the end of the growing season.

We all must admit that a liberal application of good farm manure, say for growing celery, is one of the best treatments available. No, I don't mean available, for it is no longer available—let us say the most desirable. The vegetable growers may just as well face the problem of manure shortage for it is becoming more difficult each year to secure a supply of this age-old source of organic matter. Now the golf greenkeeper is fast becoming a keen competitor. Farm manure is being dried, ground, and sold for use as a compost.

Manure shortage is, however, not by any means a modern problem. It extends back to the beginning of agriculture. Varro, over 20 centuries ago, wrote as follows: "A field is not sown entirely for the crop which is to be obtained the same year, but partly for the effect to be produced in the following; because there are plants, which when cut down and left on the land, improve the soil. Thus lupines, for instance, are plowed into a poor soil in lieu of manure." Columella in the first century A. D. wrote as follows: "Some of the leguminous plants manure the soil and make it fruitful while other crops exhaust it, and make it barren; lupines, beans, peas, lentels, and vetches are reported to manure the land. Where no kind of manure is to be had, I think the cultivation of lupines will be found the readiest and best substitute."

Annual Loss of Soil Nitrogen

These century-old statements simply show that there is really nothing new under the sun and that agriculture has always faced a manure shortage and has recognized the value of green manures as the only substitute at hand.

Before we consider the relative values of green manures as a means of conserving residual soil nitrogen and supplying fresh easily available humus, let us consider the amounts of nitrogen lost from the soil each year as the results of leaching and cropping. Results of the lysimeter studies at the Cornell Experiment Station serve well to illustrate the loss of nitrogen in the first instance. These data show that a soil under a fallow system, but cultivated at intervals, lost by leaching in five years a total of 445 pounds of nitrogen per

ANNUAL REMOVAL PER ACRE OF NITROGEN BY CROPPING INCLUDING 20 POUNDS LOST BY DRAINAGE (ESTIMATED)

Crop rotation	Pounds per acre removed	Equivalent to pounds 4-8-4 fertilizer
Early cabbage (10 tons) and celery (15 tons)	162	4,941
Lettuce (5 tons) and cauliflower (3 tons)	67	2,044
Beets (5 tons) and kale (7 tons)	99	3,020
Carrots (7½ tons) and cabbage (10 tons)	119	3,630
Kohlrabi (5 tons) and beets (5 tons)	78	2,379
Sweet corn (3 tons) ears	52	1,578
Sweet corn (3 tons ears and fodder)	100	3,035

acre. At the same time the soil in a four-year grain rotation lost 27 pounds. In a rotation of oats and four years of grass there occurred a loss of only 15.7 pounds of nitrogen per acre, 80 per cent of which was lost the first year in oats, leaving a total loss of only 3.2 pounds in four years of grass.

These figures illustrate what may happen in case of land unprotected by roots such as between rows of certain vegetable crops, and the land lying fallow after harvest. These data also show the value of growing crops as a means of reducing the loss of nitrogen through drainage waters.

In addition to the drain on the fertility each year as the result of that lost by leaching, there occurs an even more serious loss, so far as nitrogen is concerned, in that removed in the heavy yields of vegetable crops harvested. In order to give some idea of the extent of this loss, the writer has computed the annual removal of nitrogen in relation to several vegetable rotations.

A study of the above figures serves to emphasize the heavy nitrogen loss in vegetable production and should impress the vegetable growers with the urgent necessity of taking immediate steps to replace that removed in

A heavy growth of sweet clover such as shown above will when turned under supply organic matter equivalent to at least 29 tons of barnyard manure.

crops and lost by drainage. The estimated loss of 20 pounds per acre by drainage no doubt would be greatly exceeded in certain cases where heavy fertilization is practiced.

Nitrogen Conserved by Cover Crops

Reference to the figures given earlier pertaining to the Cornell lysimeter experiment will show that oats reduced the average annual loss of nitrogen from 89 pounds to 13.6 pounds per acre and during the four years of grass the annual loss was less than one pound per acre. In order to gain further information concerning the relative value of the common green manure crops in checking the loss of nitrogen, the author has computed the amounts of nitrogen contained in the tops and roots of these plants on the basis of definite yields.

These data are necessarily an approximation of the actual nitrogen that may be returned to the soil when the several crops are plowed down. The information is presented with the hope that it may further stimulate the use of green manuring crops which have many functions in relation to the conservation of soil fertility and the promotion of rapid growth of vegetable crops.

These figures emphasize the fact that green manure crops are capable of replacing farm manure as a source of organic matter. To furnish the organic matter supplied by the above crops would require the following amounts of average barnyard manure in relation to each crop: Sweet clover, 13.4 tons, wheat 14.8, oats 14.4, buckwheat 9.9, and rye 11.7 tons manure. The heavy yield of sweet clover (12 tons) supplies organic matter equivalent to 29 tons manure. Grant that the above relationship is true, then what are the comparative values of organic matter from the two sources?

Farm Manure vs. Green Manure

One of the many important functions of green manures is to supply available nitrogen during the height of the growing season. The comparative values of green manures and farm manure in this respect may therefore serve as a means of measuring the comparative values of these two sources of organic matter. Some years ago the author conducted an experiment in which various leguminous and non-leguminous green manures were studied in relation to their relative values in supplying soluble nitrates, active humus, development of soil acidity, and rate of decay. An equal quantity of barnyard manure was also included. Each material was applied to the soil at a rate sufficient to furnish the equivalent of 10 tons

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VALUE OF GREEN MANURES IN CONSERVING SOIL NITROGEN AND ORGANIC MATTER

Nature of Cover crops	Green weight of crops per acre	Total nitrogen recovered per acre	Pounds organic matter added	Nitrogen equivalent to pounds of Nitrate of soda	Nitrogen equivalent to pounds of 4-8-4 fertilizer
Sweet clover	6 tons	138	5,352	897	4,209
Wheat	6 "	100	5,928	650	3,050
Oats	6 "	90	5,760	585	2,745
Buckwheat	6 "	89	3,960	579	2,715
Rye	6 "	78	4,704	507	2,379
Sweet clover	12 "	229	11,520	1,489	6,985
*Rye or wheat	1.66 "	40	....	260	1,220
*Oats	2.66 "	61	....	397	1,861

* Plants about six inches high.

Taking the SOIL'S PULSE

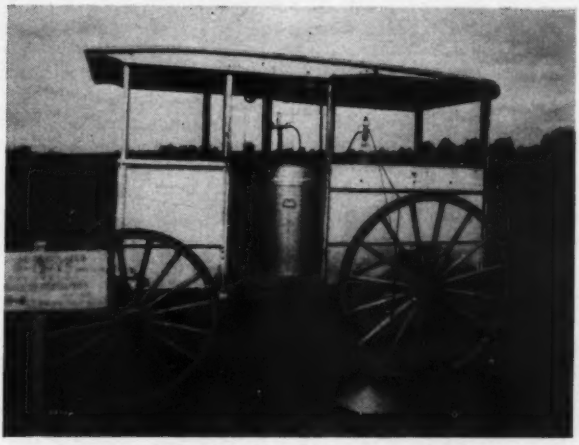
By J. C. Patterson

Iowa State College

"FIFTY-ONE fifty-two, fifty-three——

And the old family doctor gazed at his big gold watch which he held in his hand while he felt the wrist of Johnnie who had eaten too many green apples or Mary who had caught a cold.

Taking the pulse of the soil can hardly be done in that manner, but F. B. Smith, Professor of Soils at Iowa State College, Ames, Iowa, has found a way of getting information about the bio-physical condition of the soil which has the same value in doctoring it as finding the rate of heartbeat of the ailing human being has in doctoring him.



A milk wagon was remodeled for the equipment with which Professor Smith took the respiration of the soil. With this outfit he has found that the productivity of the soil is directly related to the amount of carbon dioxide it produces.

Professor Smith's method is taking its respiration. "Soils breathe," he says. "They may become choked, asphyxiated, or they may even have halitosis. They inhale oxygen and exhale carbon dioxide just as the human being does, and within reasonable limits the greater the respiration the more productive they will be."

For a long time specialists have been able to determine the amount of carbon dioxide in the air within the soil; they merely pushed a tube into it, pumped out some of the air and analyzed it. But this told them little about the physical condition of the soil.

The important point is to determine how fast carbon dioxide is produced. The only way to find out is to measure the amount escaping as well as the amount in the soil. This is what Professor Smith has succeeded in doing.

He inverts an apparatus which looks like the reflector of an automobile headlight, called a bell, over the soil. This bell has a three-inch rim around the edge which is forced into the soil to prevent any air from entering from the sides. The air which is escaping from the surface of the soil under the bell is then pumped through a tube to a measuring instrument which Professor Smith hauls about in a specially prepared wagon. The carbon dioxide is removed from the air by a lye solution and the percentage of it in the

escaping air is computed. From this the number of pounds escaping per acre per day are calculated.

In a plot which had been manured, he found the production of carbon dioxide to be 118 pounds per acre per day. One which had both manure and lime applied to it produced 332 pounds per acre per day. A check plot which received no fertilizer produced 48 pounds of carbon dioxide per acre per day.

The average yields of corn on these plots for 10 years were 44.9, 49, and 36 bushels, respectively. The production of carbon dioxide was apparently closely correlated with this productivity.

In one experiment it was found that two plots each had .6 per cent carbon dioxide in the escaping air. By inserting a tube into the soil it was found that plot No. 1, which had not been fertilized, had 1.5 per cent carbon dioxide in the air within it. In plot No. 2, to which superphosphate had been added, the carbon dioxide content of the air under the surface was found to be 3.4 per cent. The corn yield on plot No. 1 was 53 bushels. On plot No. 2 it was 66.5 bushels.

Although plot No. 1 had less than half as much carbon dioxide within it as plot No. 2 the gas was escaping just as fast from the surface, indicating a greater production of carbon dioxide in the soil of plot No. 2 than in plot No. 1. Again the larger crop yield was secured on the soil that produced the larger amounts of carbon dioxide.

Soils Are Like Humans

"The soil is much like the human body in many respects," says Professor Smith. He has spent many years studying it and has risen to the rank of assistant chief of the soils department at Iowa State College.

"Soils eat," he says. "Unless they are well fed they become weak and run-down. They must have balanced diets just as a dairy cow must have a balanced ration. They have digestive systems in which raw materials are changed into plant foods which become corn and beets and cotton instead of milk and fat and wool as in the case of animals.

"Just as there are enzymes in the human or animal digestive system which act on the food eaten, there are micro-organisms in the soil which act on the material fed to it.

"Soils have physical structures as different from each other as Farmer Jones is from his neighbor Farmer Brown, and we must consider these if we are to get the maximum returns. The experiments on carbon dioxide production bring this out more clearly than ever.

"Giving our soils manure, lime, phosphorus, potash, and other fertilizers is not sufficient. If the physical condition of the soil is unhealthy, their efficient functioning is greatly handicapped."

Reasons for Poor Health

Professor Smith suggests several things that may be responsible for an unhealthy condition in the soil if the respiration — production of carbon dioxide—is found to be below par.

Working the soil when it is too wet, causing puddling, will shut off both the chance to inhale and exhale. The gases will not be allowed to escape and the undesirable ones which should be freed will cause "halitosis," or they may even asphyxiate the soil. Incoming oxygen will be shut off, and the soil may become choked.

Plenty of organic matter should be added. This will hold the elements which produce the carbon dioxide and other desirable gases.

Straws and manures with considerable bedding should be placed on the ground long before a crop is to be planted so they have time to decompose. Otherwise they stimulate the growth of those organisms which compete with the crop for available plant food. Green manure crops and heavy

(*Turn to page* 50)

Determining the ripeness of apples in the laboratory by means of a pressure tester.

RESEARCH SOLVES PEST CONTROL

By T. J. Talbert

Professor of Horticulture, University of Missouri

THE earliest authentic record of the use of sprays for the control and prevention of injury to plants by insect pests and plant diseases is given by Pliny in his Natural History written about 2,000 years ago.

In discussing "Medicaments for Trees," Pliny states: "Many people kill both ants as well as moles with Amurca (an extract from olive) and preserve apples from caterpillars, as well as from rotting, by touching the top of the tree with the gall of a green lizard. To prevent animals from doing mischief by browsing upon the leaves, they should be sprinkled with cow dung each time after rain. Another method, again, is to pound lupines in oil and anoint the roots with the mixture. The fig trees are sprinkled with ashes; as also with rue, to keep away worms, and to prevent the roots from rotting."

Since the days of superstition, darkness, and doubt of Pliny's time, a great advance has been made in the warfare waged against plant pests. The transition has been rapid. Progress as to time and growth has paralleled the steady advance and development of the Agricultural Experiment Stations and the establishment of agricultural research.

The use of scientific methods and practices in spraying, dusting, and fumigating plants has come about during the past 40 to 50 years. Some of the factors which probably helped materially to stimulate progress in

(*Turn to page* 51)

Weighing and measuring plant food materials in the research laboratory.

A New Corn Contest

By C. T. Gregory

Purdue University Agricultural Extension Department

THE merchants and bankers of Elwood, Indiana, have a new kind of corn contest that has proved to be both popular and instructive. With this contest they are fostering better farming in their community, and it costs the merchants about $10.

First and foremost, the county agricultural agent and vocational teacher must assist. They will be quite willing because this contest is one of the best types of work to further their corn projects. The plan of the contest is this:

The county agent or vocational teacher obtains 50 or 100 good looking ears of seed corn from two or more farmers. A modified rag doll test is started on Saturday and the ears are immediately placed in some convenient store or bank where they can be examined by the farmers who wish to enter the contest and pick out the good seed ears.

Cards or pads of paper are furnished with pencils. Each sheet has the numbers of the ears printed on it. Opposite each number the farmer indicates if the ear, in his estimation, is good for seed. Then he signs his name and address and deposits the card in a suitable receptacle. The ears are left on exhibit for one week.

On the following Saturday the final meeting is held, at a time most convenient to the farmers and to the merchant or banker where the ears have been exhibited. The rag doll tests of the ears are brought out. The ears represented in each doll are laid out as that doll is read. The good and bad ears are separated with explanations from the county agent as to the reasons why each is discarded. A blackboard can be used to list the numbers of the good and poor seed ears, so that farmers may examine the ears after the contest.

Then, a committee, previously appointed, will examine each of the cards and the farmer guessing the largest number of ears correctly will be awarded a prize. These prizes are donated by the merchants and may be as many as desired but I would suggest three, for example, five, three, and two dollars.

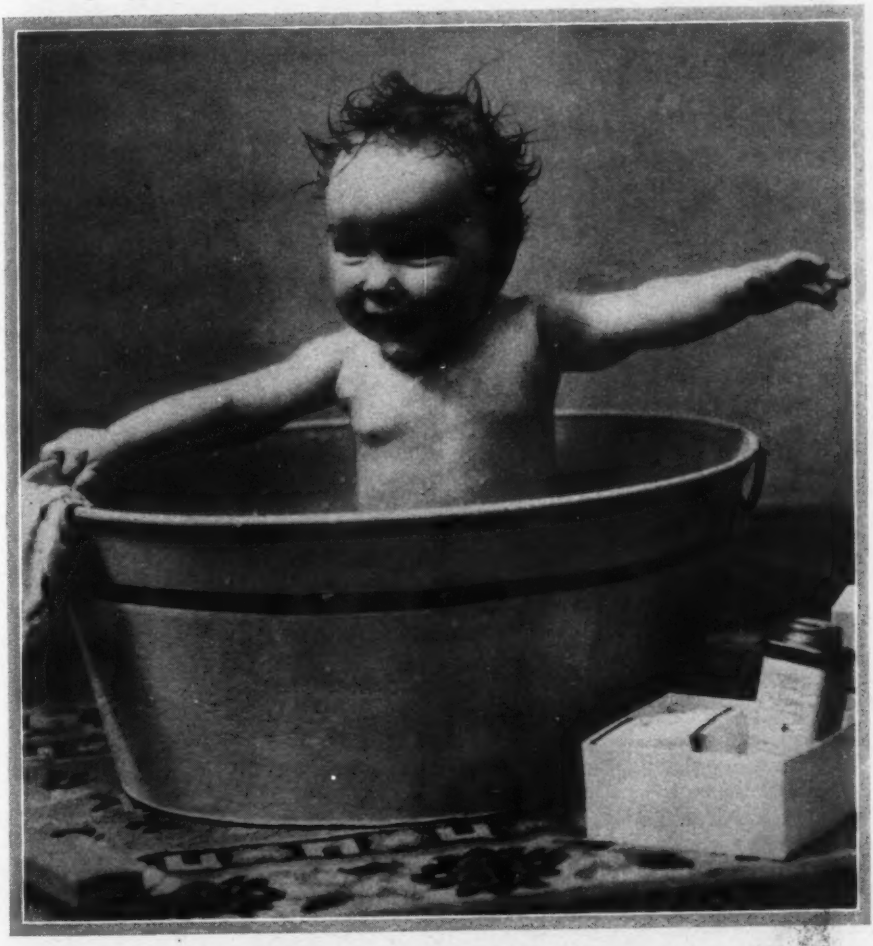
The rules of this contest should be somewhat like this:

1. Any farmer of ———— county is eligible.
2. Vocational students are not eligible in the adult contest.
3. Each farmer is allowed to examine the ears in any way he desires, but he can remove only one kernel from each ear for examination.
4. Each contestant must list on the sheet provided after the number of each ear the words "good" or "bad" according to his estimate of the value of the ear as seed corn.
5. Each contestant agrees to attend the final meeting on Saturday when the rag doll tests are read.
6. The ears of corn in the contest shall be obtained from two or more different farmers in order that no one man may have an unfair advantage.

The newspapers should be enlisted in this project and should carry announcements of the contest. They should also carry the announcements of the winners, stating what percentage of the ears they guessed correctly.

(*Turn to page* 50)

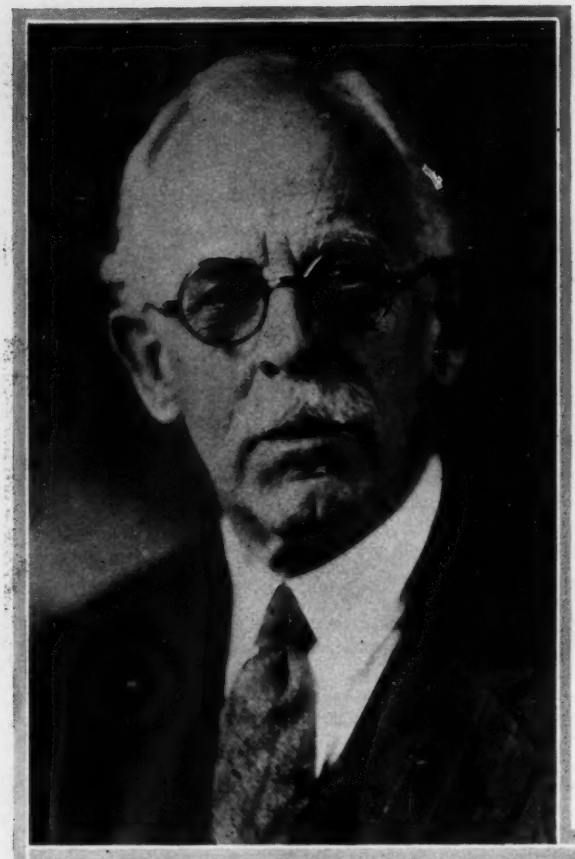
Pictorial



HURRAH FOR 1931

The pictures on this and the opposite page show potato culture in Cuba. Above: The slowness of plowing with oxen is counterbalanced by the number of teams used. Below: Planting is carefully done by hand.

Above: Fertilizer is applied in the row. Below: The growing crop makes the landscape look like Aroostook, Maine. These pictures were taken November 20, 1930, on the estate of Senor Juan Chardiet, Province of Cuba.



Left: Dr. David Fairchild, head of the Office of Foreign Plant Introduction, U.S.D.A., has been awarded the George Robert White medal, highest horticultural award in America and bestowed annually by the Massachusetts Horticultural Society. The award was made in recognition of Dr. Fairchild's work in introducing more than 80,000 varieties and species of plants into this country.

Below: J. Willard Colebank, of Germantown, Tennessee, a national winner in the 4-H club achievement contest, was awarded one of the Sir Thomas Lipton trophies at the Ninth National Boys and Girls 4-H Club Congress. Although only 18 years old, he has completed 35 project years of work in dairy calf, pig, corn, and soybean projects. He is shown here with one of his prize dairy heifers.

Right: Karl Pankop, Corunna, Indiana, has been declared Indiana's champion in the Five-acre Corn Club project for 1930 with his official yield of 129.6 bushels per acre, in spite of the harm done by the drought. The corn was grown on muck soil, broken the year before for an onion crop. He used 500 lbs. of 2-8-16 commercial fertilizer per acre on the onions and this year, 200 lbs. of 0-10-10 per acre in the corn rows, and 2½ tons of manure.

Below: Herbert C. Watson, of Tipton, Indiana, is the National Corn King of 1930. He produced 102.7 bushels per acre on his five-acre plot, from which he selected his winning 10-ear sample. "For years my Father and I have followed a soil improvement program," he says, "using a crop rotation of corn, wheat, and clover, and we now include soybeans. I used 175 lbs. of 0-15-7 commercial fertilizer, drilled in the corn row."

Above: Mike and Ike, who look alike, are Rambouillet lambs that made their first appearance in the world at the recent International Livestock Exposition. Below: Neither cow nor buffalo, but a "cattalo" is the result of crossbreeding between domestic cattle and a buffalo sire by Canadian government scientists.

The Editors Talk

The Agricultural Outlook

Looking ahead with the idea of formulating an agricultural program for the new year is, perhaps, going to be more difficult than at any time during the past ten years. One writer has aptly said, "1930 was a bad year for both profits and prophets." With this experience one hesitates in making a forecast for 1931.

The reason for the low batting average of forecasters last year was the failure to recognize that with a decline of prices in the United States, we were also entering a world-wide depression which is now considered by some to be the worst in over 100 years. However, as Colonel Leonard P. Ayres of the Cleveland Trust Company stated at the recent annual meeting of the American Statistical Association in Cleveland, economists must go on forecasting business conditions to the best of their ability, constantly seeking to improve them by more intensive research work.

Reviewing agricultural events of the past year, the Bureau of Agricultural Economics of the United States Department of Agriculture says that "the year 1930 proved to be one of rather bewildering developments. A great drought reduced corn, hay, and pasture to the smallest crops in many years. A major industrial depression curtailed the market for cotton, meat, milk, and various other products. A precipitous, world-wide decline in general commodity prices put further pressure especially upon raw materials, including farm products. An accumulated supply of wheat added to the distressed market position of that important crop. Even among bad years, 1930 stands unique.

"Agricultural production, as a whole, declined in 1930. Total crop production was about 5 per cent less than in 1929. In 1930 the total output of the principal crops was 7 per cent less per capita than in 1929 and 13 per cent less than the previous 10-year average. Notwithstanding drought and feed shortage, the total slaughter of meat under Federal inspection in the first 10 months (amounting to 10¾ billion pounds), was about 4 per cent less this year than last.

"The amazing thing, from the farmers' standpoint, was the sweeping decline in prices. The crops of 1930 had an aggregate value of $6,274,000,000, based upon average farm prices December 1. This compares with a total value of $8,675,000,000 a year ago. Thus, the 5 per cent smaller crops of 1930 had a December value about 28 per cent less than in the previous year."

December farm prices were the lowest since 1915. The aggregate farm income for 1930 as estimated by the United States Department of Agriculture will be $9,950,000,000, or 16 per cent less than that of 1929. Faced with this situation, farmers must meet the greater necessity of reducing production costs if there are to be profits in 1931. Forced to operate under conditions of low-priced farm products and a relatively high level of wages and charges, every effort must be put forth by farmers to cut costs by using only their best land, improved equipment, productive stock and seed, and by intelligent fertilization and careful planning of work.

One note of optimism may be found in the well-established fact that prices

of farm products reflect changed conditions more quickly than either wholesale or retail prices and if there is any recovery during 1931, we may logically expect prices of farm products to be among the first to show improvement.

New Sources of Income

Within a few months planting time will be with us again, and on account of more or less depressed agricultural conditions, the farmer will be in search of new sources of income. Too often the American farmer has been misled into blind alleys rather than into the open road that will put him on a sound footing. In areas like the wheat and cotton belts where it is the practice to devote most of the acreage to one crop, the first thing we hear when a depression comes is *Diversification.*

Certainly, diversification is all right provided it is confined to producing enough feed for the livestock and enough food for the farm families. Beyond this point diversification is probably just as hazardous as growing only wheat or cotton. It requires a considerable amount of money for, say, a cotton farmer to change over to growing bright tobacco. The farm help is not familiar with tobacco culture or how to fertilize, properly grade, and market the crop. Tobacco growing is a more intensive type of farming. The cost of building tobacco barns for curing, and equipping these with furnaces, is no small item of cost for a cotton farmer. What will become of the idle land? Up will go the cry to sow it with legumes, but it requires capital to buy seed to invest in a project that gives no direct monetary return. Bankers are reluctant to give credit for eight months, much less for two years.

Too often the agricultural advisers and bankers realize that the cotton farmer is "cotton sick," discouraged with producing low-priced cotton. These advisers know he is wanting a change. It is easy to say—grow tobacco—but have the advisers counted the cost of the change? Do they realize that more skill is required to grow, cure, handle, grade, and market tobacco? Have the advisers properly surveyed the tobacco in storage to see whether the outlook for future prices is any better for tobacco than they are for cotton? Have they a plan whereby the farmer can secure the money to make the change?

Some advisers will insist that they mean livestock rather than crops when they say "diversification." Certainly more livestock could be raised profitably in the cotton belt of the South. Let us say the four-horse farmer of the South who in 1930 planted 80 acres to cotton and made 40 bales (and there are many such farmers in the South) wants to go in for dairying. Generally speaking, such a farmer would own about 220 acres and have one tenant farmer who is either a renter or a cropper. Just fashion this farmer going into his county seat to see his banker to make a loan of $3,000 to buy 15 dairy cows, build a barn, and fence a part of his land. If you don't believe it would be a hard job, just try it. But suppose the farmer has the cash. This, then, is pretty good evidence that his present system doesn't need changing if he has $3,000 in cash.

Granting the change were made, who knows but that cotton-minded tenant would become impatient and discouraged when faced with milking cows twice a day for seven days in the week. You might say, that's just the trouble with the South. Well, it may be, but it is a condition the man in the cotton belt who goes into the dairy business has got to face.

Then the problem of a year-round market for the milk is not so easy to

work out in actual practice as it is on paper. In the winter when pastures are shy, milk will find a profitable market in most of our towns and cities, but when the spring brings its luxuriant covering of grass and clover, the flow of milk increases to a point where the surplus sets the price and results in no profit to the producer.

The trouble with some farm advice is that it does not come from people who have themselves been actually confronted with the same production or marketing problems that the farmer has to meet. The result is that these well-intentioned advisers do not face the conditions as they actually exist on the farm, nor do they take into consideration that any change or readjustment that the farmer makes frequently requires more money than he can easily obtain.

Wouldn't it be much more helpful to the farming industry as a whole, and the farmer in particular, if advisers would encourage improvement in methods of handling and production of the crop that the farmers are already growing? In other words, wouldn't it be better to encourage the farmers to grow 1-inch staple cotton worth 11 cents a pound rather than continue to grow ¾-inch cotton worth 9c per pound? Wouldn't it be better for advisers to encourage cotton farmers to use 800 to 1,000 pounds of high-grade fertilizer per acre and produce a bale per acre, rather than use 400 pounds per acre and produce 1/3 bale? Would it not be better to help the farmer do his present job more efficiently rather than have him change to a new type of agriculture with which he and his farm labor are unfamiliar—crops that probably over a period of years do not offer a better return—crops that are probably not as well adapted to his land?

Mr. Banker, why not summon John Smith in and say to him, "John, you have been planting 80 acres of cotton making 30 bales. Your cotton is only ¾-inch staple and brings only 9 cents. Don't change from cotton, other than to grow feed for all your livestock and enough food for you and your farm families, rather plant only 45 acres of cotton with seed that will produce 1-inch staple. Space it thick on the ground and fertilize with 800 pounds of a high-grade fertilizer. Be sure to poison the weevil lest he rob you of all your labors as well as your capital. As to the other 35 acres that you had in cotton last year, plant it to whatever crop you can use on your own farm, such as hay or small grain. Such a program will bring more permanent relief than trying to hit the high markets for this or that crop, and in addition it will avoid many costly changes which will not make your farm more profitable."

High Prices

Casually considering prices for products grown or manufactured, one is apt to conclude that the higher they go, the better for those immediately concerned. Those of us who grow cotton naturally feel that the prices prevailing in 1919 would be a permanent blessing to the industry. But would this prove true in the end?

If such prices were to prevail for any great length of time, activities in developing substitutes for cotton would be stimulated, and in due time many who now buy cotton goods would be using such substitutes. Besides, other countries and other people would find it profitable to produce cotton, and our Southern growers might be poorer in the end as a result.

A few years ago it began to be realized in the timber sections of the South that we were using this timber about four times as fast as it was being grown. It appeared in the long leaf pine belt, especially, that products of this pine timber, lumber, turpentine, and rosin, could never be cheaper than the peak prices then prevailing.

Unlike cotton and other annual crops, it is impossible to increase our supplies of timber in any reasonable length of time. What has been the result? At higher prices it became profitable to manufacture substitutes for these pine products. Experience in so doing enabled the producers of such substitutes to greatly cheapen production costs and thus to lower selling prices. Thus, when lumber became high enough to make the production of wall board profitable, this began to be made out of the wastes of the pine, the bagasse of our sugar mills, and other by-products of our several industries. The same has been true of turpentine and rosin. So what seemed an assured fact a few years ago, that products of the pine could never go lower, ends in some of them, at least, selling now at prices lower than prevailed before the World War.

Price ratios are many-sided in their applications. Granting there could be no substitute for a given product and no way of extending its production to other fields, too high a price would defeat itself in lessening markets because the trade would not be able to consume such quantities as would be the case if prices were lower.

So those of us who complain that the price of cotton is lower than the cost of production have this consolation, that it puts a premium on intelligent production, and if continued for any great length of time, will in the end shut out the inefficient producer, greatly extend the markets for cotton goods, and bring about its own adjustment.

Unclaimed Mail

Each month there are returned a small number of copies of the magazine stamped by the post office "Unknown," "Unclaimed," "Moved—left no address," etc. We have been taking these names off our mailing list. Occasionally we receive letters from our readers asking why they have failed to receive the magazine.

In a recent issue of "The Official Record" published by the United States Department of Agriculture, we find what undoubtedly is the solution:

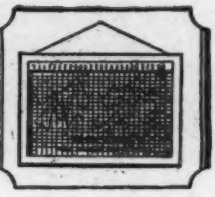
"HELP STOP UNCLAIMED MAIL

"The Office of Information receives daily, through the Government Printing Office, many pieces of mail that have been forwarded from official headquarters to places where field employees, as well as experiment station and agricultural college workers, may be stationed for only a short time. Missing the addressee, this mail, stamped 'unknown,' 'unclaimed,' 'moved—left no address,' etc., is returned to Washington.

"Field employees and others on the department's mailing lists can put an end to such unnecessary work, expense, and delay, as well as possible failure to receive publications, by requesting the postmasters to hold all but first-class mail while they are away on temporary assignments."

We trust that our readers who are anxious not to miss a copy of the magazine will advise the post-office of an absence or advise us promptly of a change of address.

AGRICULTURAL DEVELOPMENTS



CANADIAN BLUEBERRIES

Northern Ontario has other sources of revenue than its farm lands and rich mineral deposits. One of these is the crop of blueberries, which grow bountifully in that part of the country. This year about 140,000 bushels were shipped from Northern Ontario to Toronto and other centres, where, because of the high quality of the berries, they found a ready market. During the height of the season as many as 1,100 baskets were shipped daily from North Bay by express. While principally famous for mining Northern Ontario is also a very productive mixed farming area, and has great resources in forests and water power.

GOOD SAMARITANS DON'T PASS UP FOREST FIRE

Are people becoming more concerned about forest fire losses in the United States?

One of the United States rangers on a western national forest is telling a story that indicates a changing public attitude toward forest fires in the last six years.

One day in 1924 the ranger got a report of a fire on his district. On arrival he found plenty of smoke rising from the duff. Standing out of sight from the road, he kept an eye on developments.

"An auto came by," he says. "The driver stopped to put water in the radiator, saw the smoke, stepped on the gas, and went away from there.

"Another auto came by, driven by a local man. He stopped, got out, kicked around the fire for a minute or so, took a drink from a canteen, poured the balance into the radiator, lit a fag, and he, too, went away from there. Later he reported that he had put out a fire for me. Thanks a lot.

"Another auto came by, slacked up, got an eyefull, stepped on the gas, and went away.

"The next car stopped. Three men got out, took a look and a drink, and they went away from there. There were no Good Samaritans for a forest in distress. Fourteen cars had passed, and I thought I had a good cross-section of the public's concern for forest fires by the time I put the fire out. Not one of those fellows had a shovel or any inclination to put out the fire. I kept this story to myself for five years."

This season, about six years later to the day, a fire broke out near the same spot. Rangers, when they arrived, found 15 people already there, working with rakes, shovels, sticks, hands, and feet, building a 10-foot fire line around the burning area.

"There was great excitement," the ranger relates, "with more people arriving every minute and showing an inclination to get into the fight."

MEDIUM SIZED POTATOES PREFERRED BY PRODUCE TRADE

Eastern-consuming markets prefer potatoes ranging from 2¼ to 3 inches in diameter according to the Bureau of Agricultural Economics, U. S. Department of Agriculture, after a survey of market preferences in Boston, New York, Philadelphia, Pittsburg, Baltimore, and Washington.

Investigators found that dealers who supply hotels and restaurants

want potatoes ranging from 2¾ to 3½ inches in diameter and weighing from 10 to 14 ounces. Dealers also reported that good-sized tubers are best for filling orders for French fried and shoestring potatoes, since these dishes require fairly long pieces and that there is less waste in using the larger tubers for mashed potatoes.

The very large size of tubers, weighing more than 14 ounces, which are termed "bulls" or "lumpers" by tradesmen, are not wanted by any class of trade and many dealers object to accepting very large potatoes in U. S. No. 1 stock.

Considerable objection was expressed to lots of potatoes that show a large percentage of small potatoes, that is, under 2¼ inches in diameter. However, many independent retailers were found to be carrying so-called "seconds"—potatoes ranging usually from 1½ to 2 inches in diameter—for certain classes of trade. These retailers said that many people buy the small potatoes for making potato salad or for creaming, and that there is some demand for this low-priced stock from people who cannot afford or do not care to pay market prices for average U. S. No. 1 size.

An effort was made to ascertain dealers' preferences for potatoes produced in various sections of the United States. Of a total of 416 dealers interviewed, 192 indicated preference for Maine potatoes. Fifty-five dealers, most of them located in Philadelphia and Baltimore, indicated preference for Pennsylvania Rural-type stock. Prince Edward Island potatoes ranked third, and Long Island potatoes fourth. Seventy-eight dealers said they had no choice but prefer to buy from whatever section furnishes the best potatoes at reasonable prices.

Dealers in Boston and New York prefer the Green Mountain variety as a winter potato, and the Irish Cobbler in late summer and early fall before Green Mountains are available. Philadelphia dealers prefer Green Mountain, and as a second choice the Russet Rural; but Philadelphia retailers named the Russet first and the Green Mountain second. Green Mountain is the choice in Pittsburgh; Green Mountain first and Russet Rural second in Baltimore; Green Mountain first and Russet Rural second in Washington. It was learned that few consumers ask for potatoes by the variety name, although many ask for potatoes produced in a certain state.

NEW VARIETY OF TOMATO PRODUCES WELL IN STATE

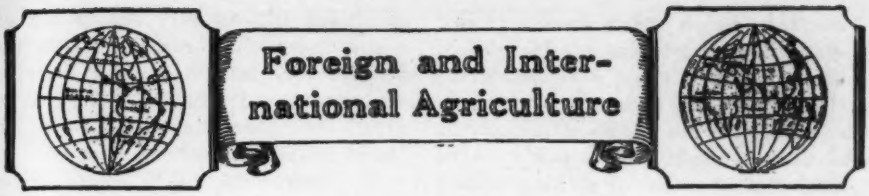
L. M. Goodwin, specialist in canning crops for the University of Maryland Extension Service, says that the Marglobe variety of tomato, recently developed and introduced by the U. S. Department of Agriculture, has shown very favorable growth and production in the state during the past summer and promises to be a profitable variety for the many tomato growers of Maryland.

Because of the unusually dry season the variety has not produced a normal crop, but it has withstood the blossom-end-rot disease better than any other kind of tomato grown in this section, it is stated.

As a result, the Marglobe variety is being lauded by both canners and growers, since it is particularly desirable, due to its smooth shape and superior quality. *Extension Service News, University of Maryland, November* 1930.

DRY BEANS

The United States produces approximately 20,000,000 bushels of dry beans a year on about 1,900,000 acres. The crop is produced in 14 States, led by Michigan and California with an annual production of 6,000,000 and 5,000,000 bushels, respectively. Last year the total crop had a farm value of $73,000,000.



Ormskirk, England

By A. E. Wilkinson

Vegetable Specialist, Connecticut Agricultural College

NORTH and east of Liverpool, England, is located the quaint, picturesque, old town of Ormskirk. It still retains its very old custom of street marketing. In fact, I was told by the Mayor of the town that this old street marketing with booths has come down through the centuries from the oldest records of Ormskirk and that means as old as anything is known of that north England country. All about this town in the big county of Lancashire are found acres and acres of potatoes. Almost one-tenth of the total English potato acreage is found here, approximately 30,000 acres.

Of the arable lands in this region, out of every 100 acres, 18½ are used for potato raising. Only two other sections of England excel in this particular. They are Lincoln and the Isle of Ely, both in the middle eastern section of England. But neither these two sections nor any other anywhere in England and Wales have excelled Lancashire county in the last 10 years as regards yield per acre. The yearly average for the 10 years is seven English tons per acre, (2,240 pounds in an English ton). This is equivalent to 261 American bushels of 60 pounds each.

The soil about Ormskirk is a light, sandy loam overlying sand. It is about 125 feet above sea level. The soil is abundantly rich, through years and years of good cropping methods and additions of fertilizers. The climate is a cold, long season type with ample rains, ideal for the best production of potatoes.

With this large, very productive acreage, problems in potato raising must be very prominent. In order to answer these problems, a local experiment station, or as the English call it a research station, has been placed in their midst. A farm of average soil for the area of 10 to 12 acres, equipped with a suitable greenhouse, dwelling, barns and sheds is available and used. It has become a great necessity because under the English law any one planting potatoes susceptible to the wart disease (a very destructive disease of potatoes) is liable to fine of so much per acre and to have his crop destroyed.

The Law Is Enforced

The Ministry of Agriculture is empowered to strictly enforce this law and does so. Each one growing potatoes must know then whether or not they have the correct, allowed variety of potatoes. The experiment station enters here. I saw on visiting this station hundreds of varieties of potatoes or strains of potatoes being subjected to wart disease in order to determine their susceptibility.

On the report of the station, the growers plant the variety recom-

mended. Much of this work is carried on within the greenhouse. Here all of the factors for rapid development of the disease are under the operator's control, thus if a variety is susceptible, it is determined very quickly. The method used is that of pinning to each potato in the eye, a section of potato wart disease. With the proper heat, moisture, and air the disease will grow if it can on the particular variety. The Ministry of Agriculture desires to encourage the breeding of new varieties and also the determining of whether or not these new sorts are wart-free. A large number of new varieties, (seedlings) are sent to the station each year for testing.

In addition to the great work of wart control and what varieties to plant, there are field tests on maturity and yield of main crop potatoes. It is generally found that late maturity of foliage is correlated with heavy yield and early maturity with low yield.

There is, however, reason for believing that certain varieties of which the foliage matures comparatively late, may produce a considerable bulk of marketable produce at an early date.

Another trial called "The Lord Derby Gold Medal Trial" is laid out with the object of determining which, if any, of the new varieties of potatoes, each being certified by the Ministry of Agriculture as being immune from wart disease, give evidence when grown at the station of possessing outstanding merit. Where their performance justifies it, such varieties are awarded gold medals which are presented by the Earl of Derby.

Other trials of value are:

1. Resistance to virus: In which 30 tubers each of 6 to 10 varieties are planted in alternating rows with a stock of one variety in the odd row which is infected with leaf roll. The trial is made in an endeavor to acquire some knowledge of the resistance of potato varieties to leaf roll.

2. The possibility of obtaining healthy stocks by rogueing. A variety is chosen that is very susceptible to virus diseases. Three lots of it are planted: one lot not rogued; the second lot rogued; the third lot seed is saved only from healthiest plants. It shows advantages for rogueing.

3. Demonstration plots of virus diseases. A number of varieties and different forms of diseases are on hand to show to visitors, thus teaching them first-hand.

When the time approaches for Lancashire first early potatoes to reach the market, practical growers are invited to inspect the plots at frequent intervals. Later, at other specific times, invitations are sent out to all growers. The growers all are interested as they directly help support the station and work by a small assessment per acre on their crop. A farm superintendent or director has full charge of the work aided by practical farm help. There is a board of managers or council which has the general charge of all the matters pertaining to this station in cooperation with the Ministry of Agriculture. This potato station has proved over and over its value, both to the individual farmer and to the economic situation in England.

BALTIMORE HAS NEW PRODUCE TERMINAL

The new Baltimore and Ohio Railroad perishable products terminal, at 209-231 West Camden Street, Baltimore, Maryland, was formally opened on October 1. Citrus and deciduous fruits, formerly sold at the Baltimore Fruit Exchange, are being handled at the new Baltimore and Ohio auction sales building.

This building is 90 feet wide by 565 feet long, and has a platform 8 feet wide along one side. It has floor space for the contents of 90 cars. One large auction salesroom has a seating capacity for 200 persons. There is also a special platform for private sales, and a large team track delivery yard. —*U. S. D. A. Marketing Activities.*

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

"Inspection and Analysis of Commercial Fertilizers; Spring, 1930," Agr. Exp. Sta., Columbia, Mo., Bul. 292, Oct., 1930, F. B. Mumford and L. D. Haigh.

"Relation of Nitrogen Fertilizer to the Firmness and Composition of Strawberries," Agr. Exp. Sta., Wooster, Ohio, Bul. 466, Nov., 1930, J. S. Shoemaker and E. W. Greve.

"Official Report on Feed Stuffs, Commercial Fertilizers, and Agricultural Lime and Limestones," Dept. of Agr., Columbus, Ohio, Spring Season, 1930.

"Fertilizer Report 1929," Dept. of Agr., Harrisburg, Pa., Gen. Bul. 495, Aug. 1, 1930, J. W. Kellogg.

"Mechanical Analysis of Finely Divided Natural Phosphates," U. S. D. A., Washington, D. C., Tech. Bul. 212, Nov., 1930, Lyle T. Alexander and K. D. Jacob.

Soils

"Soil Survey of Hancock County, Indiana, Part 1," "The Management of Hancock County Soils, Part 2," U. S. D. A., Washington, D. C., No. 23, Series 1925, W. E. Tharp, C. S. Simmons, A. T. Wiancko, and S. D. Conner.

"Soil Survey of Keith County, Nebraska," U. S. D. A., Washington, D. C., No. 14, Series 1926, M. H. Layton and W. H. Buckhannan.

"Soil Survey of Sauk County, Wisconsin," U. S. D. A., Washington, D. C., No. 29, Series 1925, W. J. Geib, M. J. Edwards, E. H. Bailey, A. C. Anderson, T. J. Dunnewald, J. F. Fudge, O. L. Stockstad, and Homer Chapman.

"Soil Survey of The Wheatland Area, Wyoming," U. S. D. A., Washington, D. C., No. 13, Series 1926, E. J. Carpenter, E. G. Fitzpatrick, T. J. Dunnewald, and Carl Pearson.

"Soil Erosion—a local and national problem," Agr. Exp. Sta., Madison, Wis., Res. Bul. 99, Aug., 1930, C. G. Bates and O. R. Zeasman.

"Irrigation Requirements of the Arid and Semiarid Lands of the Columbia River Basin," U. S. D. A., Washington, D. C., Tech. Bul. 200, Oct., 1930, Samuel Fortier and Arthur A. Young.

Crops

Four annual reports of state experiment stations, as well as the report on all of the agricultural experiment stations, 1929, by the United States Department of Agriculture and the report of the Secretary of Agriculture for 1930 are among the bulletins which have come into circulation during the past month. These important resumés of a year's work contain much of value to everyone watching the progress of scientific work in agriculture. An annual report of a state's agricultural experiment station is, of course, of particular interest to the extension worker in that state, but every farmer who wishes to keep abreast with the times also should have it for ready reference. The interest in a national report on agriculture is almost unlimited.

"Forty-second Annual Report, Fiscal Year Ending June 30, 1930," Agr. Exp. Sta., Fayetteville, Ark., Bul. 257, Nov., 1930, Dan T. Gray.

"Cherry Culture in California,' Univ. of Calif., Berkeley, Calif., Cir. 46, Oct., 1930, Guy L. Philp.

"Georgia Extension Service Report 1929," Ga. State Col. of Agr., Athens, Ga., Bul. 393, Jan., 1930, J. Phil Campbell.

"The Cherry Industry in the Lewiston Orchards with Cultural Recommendations," Univ. of Idaho, Moscow, Idaho, Bul. 171, June, 1930, Earle C. Blodgett.

"Annual Report for Fiscal Year Ending June 30, 1929," Agr. Exp. Sta., Ames, Iowa, C. F. Curtiss.

"Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., Vol. XIII, No. 2, Nov., 1930.

"American Potato Journal," Potato Assn.

of America, East Lansing, Mich., Vol. VII, No 12, Dec, 1930

"The Bimonthly Bulletin," Ohio Agr Exp. Sta., Wooster, Ohio. No. 147, Nov.-Dec., 1930.

"Garden Roses," Agr. Ext. Serv., Ohio State Univ., Columbus, Ohio, Bul. 95, Aug., 1930, *Alex Laurie.*

"The Home Flower Garden," Agr. Ext. Serv., Ohio State Univ., Columbus, Ohio, Bul. 99, Victor H. Ries.

"Growing Vegetable Plants," Agr. Ext. Serv., Ohio State Univ., Columbus, Ohio, Bul. 103, July, 1930, *E. B. Tussing and E. R. Lancashire.*

"Rate of Planting Potatoes with Some Reference to Sprouting Habit and Size of Plants," Agr. Exp. Sta., Wooster, Ohio, Bul. 462, Oct., 1930, *John Bushnell.*

"Some Rotation Experiments at the Ohio Agricultural Experiment Station, Wooster, Ohio," Agr. Exp. Sta., Wooster, Ohio, Spec. Cir. 31, Aug., 1930.

"Director's Biennial Report—1928-1930," *Agr. Exp. Sta., Corvallis, Ore., Sept.,* 1930, *J. T. Jardine.*

"Forty-second Annual Report, 1929," *Agr. Exp. Sta., Knoxville, Tenn., C .A. Mooers.*

"A Quarter Century of Dry-farm Experiments at Nephi, Utah," Agr. Exp. Sta., Logan, Utah, Bul. 222, Nov., 1930, *A. F. Bracken and Geo. Stewart.*

"Department of Agriculture Immigration of Virginia," Richmond, Va., Bul. 276, Dec., 1930.

"Horticultural Exhibitions," U. S. D. A., Washington, D. C.. Misc. Pub. 85, Sept., 1930, *Furman Lloyd Mulford.*

"Lantern Slides and Film Strips of the United States Department of Agriculture," U. S. D. A., Washington, D. C., Misc. Pub. 72, (Rev.) Oct., 1930.

"Report of the Chief of the Bureau of Plant Industry," U. S. D. A., Washington, D. C., Aug. 30, 1930, *Wm. A. Taylor.*

"Report on the Agricultural Experiment Stations, 1929," *U. S. D. A., Washington, D. C., Oct.,* 1930, *W. H. Beal and H. M. Steece.*

"Report of the Secretary of Agriculture, 1930," *U. S. D. A., Washington, D. C., Nov. 15,* 1930, *Arthur M. Hyde.*

"Apple Aphids in Ohio," Agr. Exp. Sta., Wooster, Ohio, Bul. 464, Oct., 1930, *C. R. Cutright.*

Economics

An analysis of the changes which have taken place in the agriculture of Indiana during the past 40 years is presented in Bulletin No. 342 of the Purdue University, Agricultural Experiment Station. In making this analysis, the authors, E. C. Young and F. F. Elliott, divided the state into 11 types-of-farming areas. Changes in each area were then studied in order to furnish bases upon which to recommend further changes. Such information as is contained in this bulletin should be of local value in determining the most profitable long-time systems of farming, and also of value in interpreting the annual agricultural outlook reports. To those of other regions who are interested in the problem of adjusting the type of farming to changing conditions, this bulletin should be of value because of its presentation of the method involved.

"An economic Study of the Agriculture of the Connecticut Valley," Conn. Agr. Col., Storrs, Conn., Bul. 165, Sept., 1930, *C. I. Hendrickson.*

"Regulations of the Secretary of Agriculture Governing the Inspection, Grading, and Certification of Tobacco," U. S. D. A., Washington, D. C., Sept., 1930.

"Rules and Regulations of the Secretary of Agriculture for Carrying out the Provisions of the Perishable Agricultural Commodities Act, 1930," *U. S. D. A., Washington, D. C., Oct.,* 1930.

"Farm Bulk Storage for Small Grains," U. S. D. A., Washington, D. C., Farmers' Bul., 1636, Oct., 1930, *M. A. R. Kelley and E. G. Boerner.*

"Trading in Corn Futures," U. S. D. A., Washington, D. C., Tech. Bul. 199, Oct., 1930, *G. Wright Hoffman.*

Diseases

"The Control of Celery Blights," Agr. Exp. Sta., Wooster, Ohio, Bul. 461, Oct., 1930, *J. D. Wilson and A. G. Newhall.*

"A Tuber Rot of Irish Potatoes" Agr. Exp. Sta., Knoxville, Tenn., Cir. 32, Oct., 1930, *J. A. McClintock.*

"Seed Treatment for Controlling Covered Smut of Barley," U. S. D. A., Washington, D. C., Tech. Bul. 207, Oct., 1930, *R. W. Leukel.*

Insects

"The Organic Mercury Compounds for the Control of Scab and Rhizoctonia of Potatoes," Conn. Agr. Col., Storrs, Conn., Bul. 164, July, 1930, *B. A. Brown.*

"Anyone who finds a thought which brings us closer to nature's eternal secrets partakes of a great grace."

—Albert Einstein.

A high-yielding, pure line strain of Blackhul Kafir has been developed by the Texas Station. Texas produces 47 per cent of the Nation's crop of grain sorghums, having exceeded 80 million bushels per annum and averaging for 10 years 63 million bushels per annum.

Texas

(*From page* 18)

fall and the prevention of erosion in the western portion of the state, thus increasing the stability and permanency of production of crops in that section; and, subsequently, has instituted, through cooperation with the United States Department of Agriculture, two additional erosional stations, one located in the blackland belt and one in the sandy soils of East Texas. This work is of primary importance to the preservation of the soil and to the utilization of the land and the agricultural resources of the state.

The Station owns and controls 7,285 acres of land, and property the total value of which is $1,354,576.82. The available funds from all sources for the year of 1929 amounted to $743,344.09.

Texas is a large state of abundant resources, many of which are as yet undeveloped. The citizenship generally regards the work of the Experiment Station as a necessary investment in the development of these resources and in the contribution of knowledge for the benefit of the people through the A. & M. College and all other institutions and agencies engaged in the dissemination of reliable agricultural information.

Our Extension System

THE magnitude of our agricultural extension work is impressed on the reader of the recently published book, "The Agrictultural Extension System of the United States," by C. S. Smith and M. C. Wilson (John Wiley & Sons, Inc., New York 1930, $3.50). The 5,700 employees and nearly 2,000,000 active cooperative workers in our agricultural system indicate a large and far-reaching organization, but we doubt if even with

these figures, it is realized how intimately the extension system is associated with our agricultural people, individually and as a group.

The farmer is given information and help on improved and more profitable farming and marketing systems; the farmer's wife is shown economical and attractive meals, clothing, rooms and homes; while the children through boys and girls clubs are interested in the various phases of rural life from the viewpoint of making their life on the farm more attractive and profitable. With all this work, the social and cultural side of life is given its due share, thus making a well-rounded program.

The above gives only an inkling of the many ramifications of this great force. Affecting a large and vital part of our population, it is worthy of study by all interested in the welfare of the country. Previously no collected and readily available discussion of this extension work was available. Thus the authors have performed a service in preparing this thorough, interesting, and instructive book on our extension system.

Workers within the extension field will find much helpful information on conducting the various phases of extension work. Moreover they can work better and more efficiently in the organization if they are fully acquainted with it. Farmers will probably be surprised to learn how much help they can get from this organization upon knowing how much it has to offer. In addition, all who have any business and social contacts with the farmer directly and indirectly will be able to deal more intelligently with their problems if they understand the forces that contact and influence him.

It is fitting that Dr. Smith and Professor Wilson should have been the authors of this book. Both have been a part of the agricultural extension system for a number of years and have studied and directed its work in a most sympathetic and productive manner. The authors are to be congratulated on having prepared an excellent and readable account of one of the greatest educational forces the world has ever known.

Potash and Quality Cotton

By H. E. Crawford

Agricultural Teacher, Gueydan, Louisiana

COMMERCIAL fertilizers containing potash increased the yield of cotton and gave an average return of $4.95 for each dollar's worth of potash applied in a fertilizer experiment conducted on the Gueydan High School Agricultural Farm, Gueydan, Louisiana.

This experiment was conducted by the class in vocational agriculture under the direction of the instructor. In this experiment, 14 plots each containing 1/20 of an acre were used. On seven plots, the seven fertilizer combinations were used at the rate of 100 pounds of nitrate of soda, 200 pounds of superphosphate, and 50 pounds of potash per acre. Each of the seven plots was fertilized as follows: Nitrate of soda alone; superphosphate alone; potash alone; nitrate of soda and potash; nitrate of soda and superphosphate; superphosphate and potash, and nitrate of soda, superphosphate, and potash (a complete fertilizer). The second group of seven plots was fertilized with the same fertilizer combinations but with the rate of application doubled.

The seed cotton from each plot was carefully picked and weighed. After all the results of this experiment had

been tabulated, an average of all the plots receiving a fertilizer carrying potash showed a return of $4.95 for each dollar's worth of potash applied. The greatest return resulting from the use of potash was from plots receiving a complete fertilizer and the lowest from plots upon which only potash and superphosphate were used.

Another interesting feature of the experiment was the variation in the weight of bolls taken from plots receiving potash and those taken from plots receiving no potash. One hundred bolls were taken at random from plots receiving potash and from plots receiving no potash. The 100 bolls from plots receiving no potash in the fertilizer mixture weighed 25.6 ounces, while those from plots fertilized with mixtures containing potash weighed 28.9 ounces.

The results of this experiment show very conclusively that most of our old cultivated cotton lands will be greatly benefited by liberal applications of potash or potash carrying fertilizers.

"BUTTERCUP" IS NEW SQUASH

A new squash has been originated and named "Buttercup" by Professor A. F. Yeager, of the North Dakota Agricultural College. Professor Yeager has been experimenting since 1923 with the variety which was the result of a chance crossing of the Essex Hybrid squash with the Quality variety. This season the Buttercup has reached the peak of perfection and a small quantity of seeds is available for planting.

Outstanding features of the new squash are its weight of between three and four pounds, just a nice family size; thick meat section; cavity for seeds; low moisture content, thereby eliminating watery squash; a skin that peels off smoothly and easily after baking; a characteristic button at the blossom end; and full maturity during a short summer season.

RUBBER FROM POTATOES

That a new use may be found for potatoes is indicated in a recent dispatch from the Firestone Tire and Rubber Company to the effect that the base of a new rubber product discovered by a German chemist is potato starch. "The synthetic product contains no latex or plantation rubber. It is made by mixing the starch with chemicals which coagulate into a gum-like substance that is said to differ from rubber only that it is less elastic."

20,000,000 ACRES SURVEYED

More than 20,000,000 acres of land in 27 States were mapped in the last fiscal year by the soil survey division of the United States Department of Agriculture. Dr. Henry G. Knight, Chief of the Bureau of Chemistry and Soils, under whose direction the work is done, says: "The soil survey has peculiar value at present and in the immediate future, because of the readjustment taking place in agriculture. It supplies the information upon which the Nation's inevitable land classification must be based."

FROZEN GRAPE JUICE

Solid frozen grape juice is reported as being manufactured at the rate of 30,000 gallons a day in a new quick-freezing plant recently completed at Lodi, California. Refrigeration engineers regard this as the beginning of a large trade in frozen fruit juices of all kinds, to be held in low temperature warehouses until needed, then thawed and bottled as the market demands.—*U. S. D. A. Marketing Activities,* Nov. 19, 1930.

Colored Doctor: "Well, Ah's knocked de fever outen yo' husband."

Mandy: "Den he's gwine to get well?"

Doctor: "Not a chance; but yo' has de satisfaction o' knowin' he died cured."

Taking the Soil's Pulse

(*From page* 28)

stubble should be plowed under in the fall.

Lime will improve the tilth, and a soil in good tilth is in good physical condition. Lime causes the soil particles to aggregate into crumbs, improving soil structure and soil aeration.

Fertilizers added to the soil which is in good physical condition stimulate the production of carbon dioxide and increase respiration, and these Professor Smith has shown, are closely correlated with fertility.

A New Corn Contest

(*From page* 30)

The merchants of the town can assist greatly by becoming acquainted with the rag doll testing station and the test. They will quickly be convinced of the value of this test as a means of eliminating weak and diseased ears. When they realize that the use of vigorous, healthy corn seed will increase the yield per acre about 10 bushels, the possibilities of increasing the farmers' income will be seen. Not only this, but more vigorous seed also improves the quality of corn thereby increasing its feeding value.

The rag doll is one of the best methods of separating the good corn from the bad. It finds the invisible defects that the eye cannot detect.

Our experience with this contest is that it will show farmers that on the average they cannot expect to pick more than half the good seed ears, the other half will be weak or diseased. In the Elwood contest the best man picked 78 per cent right. He would have had 22 per cent of weak, poor corn in his field. Such corn cannot do justice to the soil, and it may account for the large percentage of barren stalks.

The merchants, bankers and other business men can do much to establish the slogan among farmers, "Test every ear of seed corn and use nothing but the best." To further this idea the business men can go one step further and urge farmers to plant a couple of rows of the poor seed in their field to prove to themselves that the good seed is best. Perhaps the Rotarians and Kiwanians or Lions or some other busi-

ness club would sponsor this and give a prize to the man showing the greatest improvement in yield and quality by the use of good seed only.

In conclusion let me point out that corn root rot is largely a question of weak plants attacked by the fungi or bacteria. A strong plant will escape the trouble where a weak one succumbs.

Research Solves Pest Control

(*From page 29*)

agricultural research in the control of pests of horticultural plants were the threatening ravages of insects. Noteworthy among these were the Colorado potato beetle, in its destructive effects upon the potato industry, and San Jose scale, in its prevention of the extension of fruit growing. With the invention of the light weight steam and gasoline engine, producers generally were quick to accept these improvements which not only saved labor but supplied machinery possessing power and endurance far in excess of the dreams of the most optimistic.

It was agricultural research that gave to the grower of field crops the life history and habits of the chinch bug, making it possible to control this pest through the cooperative burning of bunch grass and other winter hibernating quarters of the insect. Likewise, agricultural research pointed the way to the successful control of the Hessian fly, often considered the most injurious insect with which the wheat grower deals.

As with the control of other pests, investigations not only brought about the adoption of measures which reduced damage to the minimum, but the researchers gave new knowledge that has enabled the producers of wheat to not only control the Hessian fly but increase the yield of wheat at the same time.

Research and practice go hand in hand in building up the spray and dust schedules for the control of insects and diseases injurious to field crops and horticultural plants. All the workable information of the horticulturist, entomologist, and pathologist is being used by the better growers. Practices in some sections may differ from those in others. This does not necessarily mean, however, that the growers of one region are better informed than those of another. The differences are generally due to environmental and market conditions.

The element of chance plays such an important role that under some conditions and during some years the spraying and dusting practices of a rather poorly informed grower may actually prove to be more profitable than similar practices of a better trained grower. The most capable producers cannot always be certain that their spraying and dusting operations are the best possible.

Our fund of horticultural information is constantly changing. What is true today regarding insects, diseases, spraying, and dusting may not be true next year or the following year. Every year brings contributions of the agricultural experiment stations and the manufacturers of spraying and dusting machinery and chemicals. Since this is true, the more progressive and forward-looking growers recheck their methods and practices and in some instances make at least slight adjustments in spraying and dusting materials and schedules almost every year.

Through the combined efforts, therefore, of the scientific and practical workers, dependable and valuable spraying and dusting schedules have been built up. Agricultural research has helped to solve the pest control problems through other means such as early and late planting, the use of re-

sistant varieties, employment and encouragement of natural parasites, the rotation of crops, the use of better culture including applications of fertilizers in order to grow more resistant and vigorous plants, and the shaping of garden, orchard, and farm practices along lines unfavorable to the development and spread of the particular pests concerned.

Green Manures and Vegetable Production

(*From page 26*)

of organic matter per acre. The following figures show the rate of nitrate formation of several of the green manure residues as compared to barnyard manure.

A study of the data below shows conclusively the superiority of green manures over barnyard manure in supplying nitrate nitrogen during the process of plant decay. The green manure residues have supplied through the nine months of the experiment 59.6 per cent more nitrate nitrogen. A study of the soils at the conclusion of the experiment showed that 43.7 per cent of the barnyard manure organic matter underwent decay as compared to 66.6 per cent for green manures. The green manures supplied 5,200 pounds of active humus per acre in excess of the untreated soil compared to 4,400 pounds recovered on the soil treated with barnyard manure.

The cause of this difference in the behavior of these two sources of organic matter is due primarily to the fact that a large proportion of easily digestible organic materials originally contained in the feed from which the manure is derived has been utilized by the animal. The organic matter in farm manure, therefore, resists decay to a much greater degree than is true of succulent green manure residues.

Contrary to the general belief, green cover crops when plowed down undergo very rapid decay. The rate of disintegration depends upon the nature of the plant residues and also upon many soil factors, such as available nitrogen, phosphorus, presence of lime, moisture, temperature, aeration, etc. Immature cover crops, such as young clover, rye or oats (about a foot high) undergo very rapid decay and soon disappear from the soil. Mature crops, however, which contain a greater proportion of resistant cellulose materials, high in carbon content and low in nitrogen, resist decay to a much greater extent.

The succulent leafy parts of the plants are the first to undergo decomposition. This is due to the fact that this part of the plant contains a higher proportion of nitrogen in relation to

POUNDS PER ACRE NITRATE NITROGEN FOUND IN SOIL AT DIFFERENT PERIODS.

	1 Mo.	3 Mos.	5 Mos.	7 Mos.	9 Mos.	Average
Check soil	26.5	40.8	40.9	57.5	62.7	45.7
Canada peas	51.1	115.9	127.0	115.0	140.0	109.8
Soybeans	46.0	70.8	136.2	137.0	143.1	106.6
Alfalfa	26.5	111.1	131.4	161.0	169.5	119.9
Oats	27.5	81.7	118.7	134.2	153.2	103.1
Wheat	76.4	138.0	147.2	238.5	207.5	161.5
Average of						
Green manures	45.5	103.5	132.1	157.1	162.7	120.2
Barnyard manures	51.1	53.8	79.5	84.7	107.3	75.3

the carbon (narrow-nitrogen-carbon ratio). The rate of decay of the roots and stems is controlled largely by the amount of available soil nitrogen, though as already indicated, many other factors have a controlling influence.

The influence of nitrogen as a factor in the decay of the "woody" tissues is taken advantage of in the preparation of artificial manure from straw and other plant materials with a wide nitrogen-carbon ratio.

Process of Plant Decay

The decomposition of crop residues is brought about by soil micro-organisms which use organic materials as a source of food and energy. The process is in reality one of digestion quite similar to that which takes place in the digestive tract of animals. These soil organisms including both bacteria and fungi ("molds") increase in number very rapidly in the presence of green crop residues.

A recent experiment conducted by the U. S. Bureau of Chemistry and Soils showed that within four days after vetch had been mixed with the soil, the soil micro-organisms increased in number from 10 to 60 million per gram of soil. On a similarly treated soil to which limestone had been added the organisms increased to 140 million. In a second test on an acid soil, rye turned under caused in seven days an increase in number of microorganisms from 20 to 60 million. Applications of limestone stimulated an increase in the soil micro flora from 20 to 210 million per gram of soil.

We realize then that a most remarkable thing happens below the soil surface in this laboratory of micro-organisms. The influence of lime in stimulating the activity of these soil flora is clearly shown from the results of this experiment. The rate of decay of crop residues depends upon the number and activity of these soil micro-organisms. These data serve to impress the reader with the fact that the soil is in reality a living thing, perhaps the most animated medium in existence, extremely sensitive to changes brought about by the application of various materials. We do not always realize that any soil treatment that stimulates a healthful and vigorous growth of soil micro-organ-

A yield of 10 tons of cabbage will remove at harvest 70 pounds per acre of nitrogen, equivalent to that contained in over one ton of a 4-8-4 fertilizer.

isms will in time produce a vigorous growth of the higher economic plants above the ground.

These soil micro-organisms which take part in the organic decay of crop residues are divided into many groups each performing a definite function, the sum total of which is the final preparation of available plant food for the growing vegetable crop. We have already seen that green crop residues greatly stimulate the formation of soil nitrates upon which the fast growing vegetable crops are dependent.

Now when green manures are in the process of rapid decay, during the first few weeks after being incorporated with the soil, these nitrates are utilized by certain groups of micro-organisms in order that they may break down the cellulose and other carbonaceous plant materials, more resistant to decay. This is due to the fact that all soil flora contain in their living tissues both carbon and nitrogen and therefore can not multiply and function in the absence of this source of food or energy. Keeping this fact in mind, let us see just how this utilization of soil nitrates by micro-organisms may affect the higher plants.

During this period of rapid decay there actually exists keen competition between the plants below the surface (soil micro-organisms) and those above the ground for every trace of available nitrate nitrogen. For the first few weeks the soil organisms win out and the vegetable crops may suffer for lack of nitrogen. This is often shown by a yellow or light green color of the leaf which may be mistaken for disease or lack of water.

This period of nitrogen depression is fortunately of short duration, for as soon as the crop residues reach a stage of advanced decay, the nitrogen-using organisms which contain organic nitrogen in their body tissues are utilized by the nitrifying organisms which results in the liberation of large quantities of nitrate nitrogen. Reference back to the nitrate figures will show that the soil treated with alfalfa residues supplied nitrate nitrogen in the following progressive order: 26.5, 111.1, 131.4, 161.0, and 169.5 pounds per acre.

Significance of Carbon Dioxide

In the process of plant decay there is generated a considerable volume of carbon dioxide gas which is the final product of organic decay, that is, so far as carbon is concerned. This carbon dioxide gas passes into the atmosphere by the process of soil respiration. A measure of the amount of carbon dioxide given off from a definite volume weight of soil furnishes the chemist with a means of determining the rate of plant residue decay.

Carbon dioxide is also given off by the roots of growing plants. When this gas combines with the soil water, carbonic acid is formed which has a significant value as a means of dissolving mineral plant food, thus rendering it available for vegetable and other plants. When carbon dioxide passes from the soil into the zone occupied by the growing plants, it is rapidly absorbed by the green leaves by a process known as photosynthesis. In this manner the plant manufactures its starch and cellulose materials from the carbon dioxide of the atmosphere.

Experiments have been conducted which have proven that the growth of plants can be hastened by introducing carbon dioxide into the leaf zone in excess of that normally present. From this we may learn that carbon dioxide is an important factor in the rapid development of leafy plants or those which produce considerable starchy materials such as potatoes, beets, etc. Green manures no doubt have a great value, therefore, in supplying additional carbon dioxide, a fact which is not fully realized.

It is surprising to learn that to produce a crop of 400 bushels of potatoes requires that the green leaves of the

plants absorb 9,600 pounds of carbon dioxide gas necessary to produce the starch found in such a yield of tubers. In addition to carbon dioxide required to manufacture the starch in the tubers, there are required also 6,000 pounds of carbon dioxide necessary to produce the cellulose found in the leaves, stems, and roots of the potato plants.

In other words, to produce a 400-bushel crop of potatoes actually requires that approximately 15,600 pounds of carbon dioxide be absorbed by the potato plants. To produce this much carbon dioxide would require the complete decay of 18 tons of farm manure. Based on the normal carbon dioxide content of air, it would require over 45 million cubic feet of air to supply this weight of carbon dioxide gas.

These figures are presented, not that you may do anything about it, but merely to point out the fact that green manure decay may have a value in this respect which has been given very little consideration. The writer believes that in a case of heavy yields of grain and vegetable crops carbon dioxide often becomes a limiting factor.

In regard to the type of cover crop to use, it should be emphasized that non-legumes have a far greater value in relation to leguminous crops than has been realized. After harvest of the late vegetable crops either rye or vetch may be seeded, which greatly reduces the loss of soluble nitrogen during the fall, winter, and early spring months.

This means of nitrogen conservation by cover crops together with the added value of the crop residues returned to the soil may be emphasized as the ultimate value of the practice of green manuring. Green manures in an intensive system such as followed in vegetable production will not actually build up soil organic matter, but will go a long way in replacing that lost as the result of excessive decay.

Long-lived Alfalfa

(*From page 7*)

tive than those we have used. Varying the ratio from a 2-10-10 which we have used might also help. These matters will form the basis of certain future work which we hope to undertake with this important forage crop.

The use of higher quantities of lime than were carried by the basic application in this experiment has been distinctly disappointing. While we have no doubt about the need for lime for alfalfa culture on this soil, the original pH of which was around 5.2, the use of two extra tons per acre over the two tons carried by the check plots has served to slightly depress alfalfa yields. This depressing effect is probably not due to the lime itself, for the soil on the more heavily limed areas approaches neutrality more closely than it does on the check strips, but to the indirect effect of rendering the potash in the soil less available for the alfalfa.

While we have very little evidence from New Hampshire supporting this theory, that which we do have indicates that the use of lime renders soil potash less available for crop needs. This may be one of the reasons why alfalfa responds so readily to potash, particularly as farmers have tended to apply an excess of lime upon seeding alfalfa "to last it through its long life." I am not sure but that many farm advisers have been guilty of advocating this practice. Even so, it may be sound if proper fertilization is resorted to at seeding and later in top-dressing. From the other angle, however, it is now possible to buy

both phosphorus and nitrogen carriers with lime in their make-up, which might be used for top-dressing should the initial lime treatment have been small.

At any rate this field has served to demonstrate that alfalfa can be successfully grown on old hay lands if they are adapted to it, provided proper attention is given to feeding the crop. In some ways such fields are more favorable than more heavily cropped land as they do not present the menace from weeds and perennial grasses found there. And aside from the facts learned in this four-year test about lime and the three important elements, which have been discussed above, maintaining the yield in the more heavily fertilized plots for even that length of time on such a soil is of much practical interest.

Weeds Can Be Killed With Kainit

(*From page* 20)

planted to corn to be followed by strawberries the next season.

"The sorrel was a regular mat," Mr. Parker stated, "and I could not plow it under. It just stood up on edge and I was really ashamed of that job of plowing, but it couldn't be helped. There are hundreds of acres just like that in this neighborhood and if kainit will kill the sorrel then it will save us growers many dollars."

This field was watched very closely and during the corn season practically no sorrel appeared. At the end of the year only a few small plants could be found on the treated acre. The illustrations with this article show the treated and untreated land as they appeared the latter part of April, when sorrel, in this section of the country, has made considerable growth.

Mr. Esham set strawberry plants in the treated field following the application of kainit, while Mr. Parker, as noted above, planted corn. However, the same results were apparent in that practically no sorrel appeared on the land where the kainit was applied. Only 400 pounds of kainit per acre were applied by Mr. Esham. In the future Mr. Esham will use a lime spreader for the operation instead of hand labor, as he feels he can do just as efficient a job with the machine.

The very enthusiastic reply that Mr. Esham made when asked his opinion regarding the use of kainit for killing sorrel indicates the results that have been secured and the benefits that will arise from the control of weeds in

Another view of the strawberry bed where 400 pounds of kainit per acre were applied to the land in the foreground and none was applied to the land in the background.

strawberry growing areas of the country:

"You can see by looking at this field that I have no sorrel anywhere except along the ditch bank where I could not apply the kainit. I am so well satisfied with the results that I have ordered enough kainit to spread over 10 acres on that farm over there that I have just bought. I am ready to tell anyone that kainit has got rid of sheep sorrel on my fields."

On the dark spots of this field in Germany, the charlock was destroyed by an application of kainit.

Another problem, or rather one of two problems, now presents itself—that of killing the sorrel while growing among plants already in the field. Obviously some remedy must be used that will not injure the strawberry plants, and for this purpose it is planned to use a finely ground form of kainit (almost a powder) and apply this with a hand duster or blower. This method is the one employed by experiment stations in Europe and Nova Scotia. The kainit is applied to the plants, preferably in the early morning, before the dew is off and when the air is calm.

Among other weeds that infest the strawberry fields are chickweed (Alsine media) and Crane'sbill (Geranium pratense), both very persistent and as Webster says "positively troublesome." An application of kainit was applied in the spring of 1930 to fields infested with these two weeds, by Mr. Parker, and results should appear during this growing season.

Thousands will, or can be saved, by strawberry growers on the Peninsula as a result of these tests or demonstrations conducted by Mr. Parker and Mr. Esham as the eradication of sorrel will increase yields and quality of the berry as well as cut down cost of cultivating. Another important fact is that with the eradication of sorrel and other weeds the growers will be enabled to carry over strawberry fields for several years whereas at present two years is about the limit of profitable production without renewing the beds.

The Inquiring Mind

(*From page* 23)

recognition certificate. But better than University honors is the place he earned in the hearts of those with whom and for whom he worked. Thousands of farm folk waited weekly with keen anticipation to read his Hope Farm Notes, and from them gained new courage to meet their problems, fight the battles they confronted, do right, deal honestly, and practice kindliness and generosity, in the spirit of Christianity, with reverence of God and respect for His Holy Book.

Herbert Collingwood could not hear the singing of the birds, the whisper-

ing of the breeze in the tree tops, the rippling of the brook, or the merry laughter of little children; but he dwelt inwardly with the treasured memories of the sounds and songs of his youth and delighted in the open country and all of the wonderful works of the Creator. To him there was charm in the rosy cheeks, smiling lips and robust bodies of healthy children, with whom he surrounded himself, and to whom he opened his home and welcomed at his table and fireside. Mrs. Collingwood and their daughter also loved the "red-heads and tow-heads" and their hospitable home, pleasantly situated among fine gardens and orchards, gave many a thankful child a happy, well-directed start in life. The man who, as a boy, was made to work on the frosty side of the barn saw to it that those of his family circle lived and laughed in the beneficent sunlight of love and good will.

Fought for Farmers' Rights

In addition to these kindly attributes, and the humor, poetry, and sentiment which characterized this tender-hearted "neighbor," who "lived by the side of the road and was a friend to man," the sage of Hope Farm could, when occasion demanded, fight valorously for the right, with all the courage and hardihood of a crusader. He hated dishonesty, graft, and evil-doing in high places, and ever defended the farmer against his foes. He strove mightily in opposition to legislation that antagonized the farmer's best interests and strived to effect the passage of laws that would aid and protect him in his life and work. His indefatigable labors in this direction no doubt contributed largely to the redress of certain wrongs, and the thousands of farmers who weekly read his paper and mourn his loss looked upon him as a champion of their rights, a fearless, honest leader and a counselor whose advice always was wise and well intended.

John J. Dillon, who for well on to forty years worked with Mr. Collingwood as business manager of the Rural New Yorker, said of him:

"Charity, kindness, and sympathy were his dominating traits; yet when occasion required, he could whet a pen until it cut like a razor. He used no bludgeon, and when foes were vanquished, he never pursued them. He fought men only when they obstructed the way to public good. His natural mission was peace, not strife. He had talents and qualities that qualified him for success in a more remunerative career than that of farm journalism. They invited him. He rejected these. He loved the work of his choice. He took his duties seriously and joyously as an advocate of farm interests and a champion of farm rights."

Nature His Companion in Silence

Then William W. Higgins, who was his working associate for twenty years, and who is today the successful managing editor of the Rural New Yorker, depicted another phase of his Chief's character in the following words:

"He possessed the finer instincts of poetry and sentiment. He loved the farm and all things and people growing there—the green of spring, the newly turned furrows, the cornfield, the strawberries, the ripening peaches, the clusters of red apples, the lichens on the stone wall. His trees were companions."

And so, you see, a deaf man can achieve fame, earn a wonderful reputation, wield a trenchant pen for good, and have a splendid influence.

One great secret of his success is, I think, told in these fine words of this friendly, kindly, Christian gentleman, taken from his notable book "Adventures in Silence":

"A firm trust in God and a sincere belief in His power and mercy should be 'as the shadow of a mighty rock in a weary land'—of silence. We must have the best possible moral support."

And so say all of us!

Side-dressing potatoes at the first cultivation is becoming more common.

Fertilizer Facts

(*From page* 14)

tions on potatoes.

These fertilizers are also suitable on black sandy soils for grain. When a seeding is to be established in the grain use 400 pounds; and for grain use 250 pounds.

The experience of the soil experts at the Coddington station indicates that fertilizers low in nitrogen, such as the 2-8-5, 2-8-16, 2-12-6 and 3-10-10 mixtures, are suitable upon grain crops which are to be sown to legumes upon ground not previously or only lightly manured for corn, or where it is thought more nitrogen should be supplied for grain. The amount used should be between 300 and 500 pounds an acre.

Mr. Albert is of the opinion that clear, superphosphate fertilizers have no place in sandy land farming except as they might be used as a supplement to manure and be applied with it. He is convinced that potash applications are required for new seedings. In some instances, where the farmer is reasonably sure that his soil is well supplied with phosphorus, clear muriate of potash applications as top-dressings for alfalfa are satisfactory. This plan permits phosphate applications with the manure spreader and the potash can be nicely and rapidly applied by hand instead of by special fertilizer spreading machinery.

The Suwanee River Country

(*From page* 12)

ty, near Gainesville and less than 30 miles from the Suwanee River. Now some small to considerable acreages are found through central and western Florida, south Georgia, south Alabama, south Mississippi, and in Louisiana.

The fruit of the tung-oil tree, which somewhat resembles an apple in shape but which carries a worthless husk similar to black walnuts, contains, usually, five seeds. The seeds contain oil which tends to make varnishes water-proof, and is used to the value of $15,000,000 annually in the manufacture of American paints and

varnishes. Importations from China are unsatisfactory, and hence the manufacturers are anxious to see an American supply established.

The Chinese methods of extraction are crude and wasteful. However, a modern power expressing machine, the first of its kind in the world, has been recently erected near Gainesville, Florida, and is manufacturing American-grown tung oil on a small commercial scale. The plant can be expanded as the needs of the industry demand.

The plant is an adaptation of similar machinery used for expressing oil from peanuts, cotton seed, and other oil-producing seed. The whole tung-oil fruit is poured into the hopper, where it is husked and partially shelled, and then crushed and pressed. The husks are delivered to one basket, the pomace to another, and the oil to storage tanks.

With the placing in operation of this crushing mill, the greatly increased acreage which is coming into bearing each year, and the widespread interest in the industry, the American tung-oil industry seems to have "arrived." And it has radiated from the Suwanee River country.

So much for the new crops which this area has contributed to the United States. By stretching the imagination slightly to include Quincy, Florida, in the Suwanee country, this country can be credited with having contributed a cultural practice which has been adopted by cigar-wrapper tobacco growers wherever cigar-wrapper tobacco is grown in the United States. Connecticut was the first state to adopt the practice after it was developed in Florida. The practice in question is the growing of cigar-wrapper tobacco under partial shade.

About 1895 Mr. D. A. Shaw, a tobacco grower of Quincy, was experimenting with different types of cigar tobacco. In the course of the experimentation he observed that plants grown under the partial shade of trees near the edge of the field seemed to produce thinner leaves which were better suited for cigar wrappers than were the leaves of plants grown in the open. In 1896 a partial shade was constructed over one-fourth acre of land. A decided improvement in the quality of leaf produced was the result, and the construction of shades began immediately in the Florida tobacco district. By 1900 the practice was beginning to be adopted in Connecticut. The originator of the process died at Gainesville, Florida, during 1930.

And so, in the course of time, the Suwanee may become as famed for its contributions to American agriculture as it is for its leading part in a popular old folk song.

Faith, Hope, and ?

(*From page* 4)

of Madame Charity. We sent for her because the deacons said she was Love in disguise.

Charity came in as a sort of hired girl—someone to look after the delinquents and the misfits. I presume the original aborigines here did not employ her very much. She is one of our Caucasian innovations.

But like all hired hands who get an inch in edgewise, Charity soon took a mile. She used to eat at the second table or in the kitchen, but now she sits at the head table with Dad and Mom, and gets the first helping of the goose and gravy. We take what's left to feed ourselves and find that reliable Missus Faith sits outside with Lazarus, gnawing the cat scraps.

Somehow we have overlooked the edict of experience through all the ages, that prevention beats cure. We utilize prim Miss Charity in the guise of Love, whereas if we applied a little

more of Missus Faith's homeopathic remedies to begin with, perhaps Mr. Hoover wouldn't have to write a Thanksgiving proclamation with one hand and a survey of the jobless with the other.

I REALIZE that I am quoting Paul in one breath and discounting him in the next one. He said, you remember, that the "greatest of these is Charity." But again, somebody later on remarked that "Charity begins at home."

That's just the ticket! If we had used a little more Faith in ourselves and a little more Love on everyday problems, we would be as happy now in the midst of super-power as our elders were by candlelight. Charity is great in an emergency, but we must use Faith to prevent emergencies.

Another reason why our Faith is weaker in spots is simply because we have overworked her on the credulous. Bogus prosperity claims, fevered newspaper propaganda, proclamations followed by denials, charting our courses by ticker-tape—these elements of the business barometer have put Faith out on the door-step and given us Charity as the star boarder.

Charity may mean that somebody is benevolent, but it also often signifies that somebody has blundered. Let's hope that America will be the first to get out of the Blunderbund.

If you had a neighbor with more money in the bank than he knew what to do with, and supplied with a surplus of victuals on a flooded market, and he starved some of his children—would you call the police or the poor relief agents?

Yet here stands our benign old Uncle Sammy in that very same position, hoping that Legge can hold back the wheat planting in Kansas and trusting that the bread-lines won't be too long in Detroit.

I met my friend, the Master Farmer, yesterday over at the implement shop. He was buying a new disk, three-bottom plow for the spring turn-over. Regarding his act as a supreme show of faith and "evidence of things not seen," I asked him if he thought farmers, as a rule, had as much faith or perhaps more of it than big business or the industrialists.

After he had pondered awhile and we had both run it through our small-town minds, we arrived at an agreement respecting Faith and the Farmer. We took our first cue from near-by economics. The implement house had been selling tillage equipment at fairly normal rates of trade, but a machine tool house that stocks factories was shut down completely.

Ergo, the farmer buys tools for replacement purposes by the signs of the seasons, as far as he is able. The industrialist gauges his purchases by the signs of the time as charted by human elements. His purchases bear little relation to his actual buying power at such times, while the farmer's chief limit is usually his buying ability.

THAT is, the farmer deals with hazards that are not human and are largely uncontrolled, at least in his main business of production. Facing climatic uncertainty and being ready for a feast or a famine, he must needs come into the seed time fully prepared to do his bit. He doesn't know whether there will be hail or a halo for him; he must meet the freaks of fortune. Nature has been more generous with farmers in our section than abusive or contrary, and what's poison for grain may be pie for corn. Living with the elements at his elbow, a farmer gets to be almost like the birds and fur-bearing animals. He goes the round of the seasons with calm precision, doing his customary duties and making his seasonal arrangements.

Hence the farmer has inbred Faith by generations of soil contact. He lives by no other rule, and this in itself may be irritating to some orderly minds who want farmers to change over and act like industrialists. We concluded that in his own personal,

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individual moods and methods the average up-to-date farmer is a true disciple of Paul in matters of Faith; but here we sidetracked a little and considered the farmer in a collective way, in his organization aspects.

We decided that just as soon as the farmer came into direct contact with human elements and perverse streaks in human nature, as he more often does in politics or organization work, his Faith weakens to a point where it is sometimes less effective than the Faith of the industrialist.

TAKE two of my mutual friends, one a Radical and the other a Standpatter, and both farmers. Neither one has joined the anvil chorus knocking agriculture, and both operate high-class farms. Both have undying Faith in their calling and they can agree over the plow handles on technical agriculture. But the Radical lacks Faith in present-day capital, and the Conservative sees no good in the promises of political reformers. The perplexing moods of Dame Nature do not shake their Faith. They have confidence in their ability to deal with stubborn soils and noxious weeds, with storms and drought. Even when they are licked, there is "always another season coming."

But the Radical is annoyed at the claims of the middlemen and the deals of the grain exchanges, while the Conservative smiles in derision at the hopes erected by legislation.

In their crop and livestock management, they go on the sane basis that Faith is guarded by tasks done right at the right time. Failures they are willing to blame on tasks done wrong. But at the point in their working lives when self-reliance and deep thinking ceases to aid them, and they must mingle with other outside forces, we notice that their Faith snaps and breaks down. Missus Faith simply won't leave the old farmstead.

It would do little good to advise the Radical to join the Rotary club or the Conservative to become a Unionite, even though some attractive bait could be found to tease them thither. And even though they listened long to Babbits or Townleys respectively, they wouldn't be quite sure that thus and so was right; and anything that isn't right cannot command their Faith.

On the other side of things, the average citizen's general regard for agriculture is high. It checks with what we have described, because the average citizen's Faith in the farmer diminishes in direct ratio with the amount of political organizing done by the grangers.

IF cooperation is going to achieve one thing worth while it is going to enable farmers to learn human relations among themselves and then enter pitch and toss into the broader contacts of world commerce.

By this I mean they are going to take old Missus Faith out of the farm kitchen and take her to a cooperative rally or "sociable," introduce her to wider horizons by gentle degrees, help her to get wise to the parlance of modern barter, and teach her that even Alexander Legge and Jim Stone abhor dress suits, but wear them if necessary at a ten-course financial function.

I am sure that cooperative forces can do this successfully without robbing Faith of her high regard for truth-in-advertising. In fact I feel that with a careful treatment of this nature administered to Missus Faith by her allies on the farms, we could make her just as aggressive in the city as she is in protecting the hen-coop at home.

In the meantime there are plenty of forces that would prefer to see farmers keep Faith at home with the pigs and chickens, and depend on Hope and Charity when they drive to town. But if this agricultural fairy tale has its proper ending, we shall see Cinderella Faith marry Prince Charming and let the other two sisters sit by the

dying embers.

For the present I see in the youth movement on farms a powerful push for Faith. The 4-H youngsters meet in state and national reunions and grow up in frequent contact, barring creed and prejudice. This means that they are studying the new styles in dresses and bonnets for Aunt Faith, and intend to drag her right out where her good works won't be hid under a bushel of apologies.

It will give them incentive to primp her up if we name some of the good works she has already accomplished.

Some forty years ago the railroads got rampant and up rose the farm phalanx and sat down hard on them, after a doughty tussle, in which Faith took hold with a hammerlock. Railroad rate regulation, and elimination of rebates, and passes resulted.

Agriculture insisted that science and instruction be regularly offered to farm folks. So by degrees we have the Morrill, Hatch, Adams, Smith-Hughes, and Purnell laws to the credit of Faith.

Regulations were needed within the industry, and so Faith jumped in with the farmers and secured certain active departments, both state and federal.

Finances needed more stretching and rebound in the agricultural zones. In due time we had the Federal Farm Loan, the Agricultural Credit Act, and the Intermediate Credit banks.

Scattered creameries and shipping associations became aware of their natural enemies and united power, and behold we had the Cooperative Bureau at Washington and the Federal Farm Board in 1929!

The lesson in this lies in the fact that when farmers found out that Faith was pretty much the whole works, they quit pitchforking and began to saw wood. They have cut off quite a few nice chunks already. If it's too green they may smoke somebody out. But they've waited long enough for the timber to be bone-dry, and the sparks are flying now.

So at the New Year I have little doubt in my heart about the good intentions of farmers, providing they stick to their Faith and lead her out on the big parade ground.

I have got around quite a bit lately, even as far as Chicago, since the Dismal Davids began howling. It seems to me that we have had more squawking on the boulevards than we ever heard on the bush roads. When the farmer was sickest, he hired somebody to do his grunting and groaning for him. For himself, he was too busy courting Faith and paying taxes.

I guess that we all ought to resolve to use the anvil and the hammer for construction work, to forge stronger national links. Hitherto many of us have used them for knocking only.

And if we do that right along, we can install Faith permanently in the superintendent's office and keep Hope and Charity for ornamental purposes.

FORE!

Four golfers were resting at the ninth green which was behind a mound, when a battered ball came over the rise and rolled into a sandy trap. The player was not in view.

"Let's make him think he did it in one," said one of the golfers.

So they picked up his ball and put it in the hole.

Presently a weary player walked over the mound and looked about for his ball. The four men rose at him, shouting, "Did you hit that ball? Bravo! You've done it in one, old man. Look! It's in the hole!"

The player looked bewildered.

"Here's how it rolled," they said, tracing a course across the green.

"A perfect shot! The right angle and the right strength! Bravo!"

The weary player pulled out a tattered scorecard.

"Good," said he, "that makes it 30 for this hole!"

Beneath the spreading chestnut tree
The smith works like the deuce,
For now he's selling gasoline,
Hot dogs and orange juice!

Brevity is the soul of modern journalism. A budding journalist was told never to use two words where one would do. He carried out this advice in his report of a fatal accident in the following manner:

"John Jones struck a match to see if there was any gasoline in his tank. There was. Age, sixty-five."

CONTAGIOUS

Tim: "Going to the doctor?"

Tom: "Yes, I don't like the looks of my wife."

Tim: "I'll go with you. I don't like the looks of mine either."

On the eve of their execution, an Irishman, a Scotchman and a Jew were asked if they would like any special delicacy. The Irishman voted for Irish stew, the Scotchman for a bottle of whiskey, and the Jew fancied strawberries and cream.

"But," protested the warden, "strawberries are not in season."

"Vel," replied the Jew, "I can vait."

—*Judge.*

Parson: "Does your daughter trust in God, Brother Jones?"

Brother Jones: "She must, judging by the company she keeps."

KNEW THE BREED

Little Mary Jane and her next-door neighbor, Billy, were engaged in an absorbing conversation.

"What are anarchists?" asked little Mary Jane.

Then Billy swelled with wisdom.

"They want everything any one else has got, and they never wash themselves," he replied.

"Oh, yes," cried little Mary Jane, with enthusiasm. "I see—they is just little boys growed up."

—*Peacock Feathers.*

New Improved

DUBAY

SEMESAN BEL

The last word in Seed Potato Disinfection

Better Disease Control **75% Lower Cost**

GREATER CROP PROFITS

New Improved Semesan Bel is a definite step forward in seed potato disinfection. In all-round effectiveness, ease of use and crop improvement, *New Improved* Semesan Bel stands ahead of all other treatments.

Here are the facts!

The *New Improved* SEMESAN BEL controls seed-borne Rhizoctonia and Scab. That means larger crops, better quality, more profit for the potato growers. Our 62 miles of test rows in 18 states prove its efficiency.

A pound of this new poduct treats 70 to 80 bushels of seed potatoes. Over 3 to 4 times more than the old. The cost of treatment is now only 1½ to 3c a bushel. Acquaint yourself with it.

Our Proposition to Extension Workers is this:

We will furnish any County Agent or Vocational Agriculture Instructor, upon request and without charge, sufficient *New Improved* Semesan Bel to treat seed potatoes for 1 to 5 one-acre demonstration plots. Also we will send you simple instruction sheets for making practical potato demonstrations.

To further aid you in conducting your seed treatment campaign, we will lend you, free of charge, interesting and entertaining motion pictures showing the need for seed treatment, the simple method of application, and the profitable results obtained. These films are available for potatoes, corn, grains, cotton, and vegetables.

Fill in the coupon for demonstration quantities of *New Improved* Semesan Bel and specify the movie films you desire.

BAYER-SEMESAN COMPANY, INC.

Bayer-Semesan Company, 105 Hudson Street, New York, N. Y.

I would like to demonstrate *New Improved* Semesan Bel. Please send me sufficient material for ..... one-acre plots.

Also send me information as to how to secure .....

..... motion pictures for showing on ... .

Name .....

Address .....

He made his pasture his best-paying land

H. E. ROBERTSON of York, Pa., is a successful dairyman. The prize-winning Robertson Farm Holstein herd is one of the highest producing herds in the Northeast.

Mr. Robertson prospers because he is alert and eager to find new methods of increasing the efficiency of his farm and lowering his production costs. This is proven by steps he has taken to make his pastures pay him a real profit.

Milk at Lower Cost

Although he had a good pasture he became convinced that a fertilized pasture would enable his herd to produce milk at lower cost. Last March he fertilized four acres with 600 pounds of early potato fertilizer per acre. He compared milk production on that area with production on nine acres of unfertilized pasture.

The fertilized pasture furnished grazing 11 days earlier. This early grazing saved $144.08 in barn feeding costs. The fertilizer applied on the four acres cost $49.60. For the pasture season the four fertilized acres produced as much feed as the nine unfertilized acres.

Use Your Potato Fertilizer

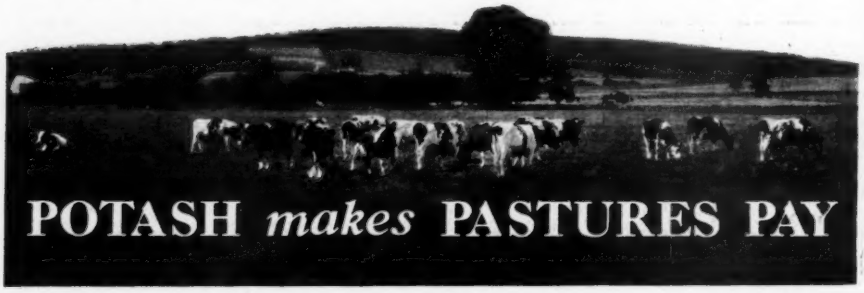
Without fertilizer, Mr. Robertson had one of the best pastures in Pennsylvania. With fertilizer, he converted it into the best-paying land on his farm.

It will pay you to grow good, cheap, green feed on a fertilized pasture and let your cows harvest it. This increases milk profits by reducing barn feeding and labor costs. Six weeks before you usually turn out your cows, use at least 600 pounds of a pasture fertilizer or a high grade potato fertilizer per acre on your pasture.

N. V. Potash Export My., Inc.

of Amsterdam, Holland

Baltimore Trust Bldg., Baltimore, Md.



POTASH *makes* PASTURES PAY

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